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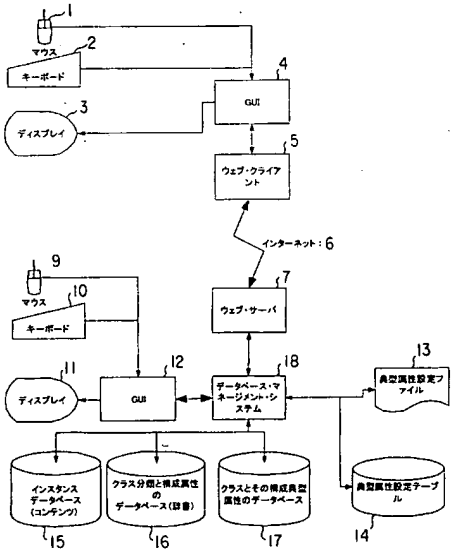
(54)【発明の名称】階層型データベース装置及び階層型データベースの構築方法

(57)【要約】
【課題】階層型データベースの分類に関連付けて典型属性を設定することのできる階層型データベース装置を提供すること
【解決手段】下位の分類が上位の分類の属性を継承する階層構造を持つ階層型データベース装置において、第1の分類が有する少なくとも1つの属性を典型属性に設定し、各典型属性に対する検索条件を含む付帯情報を、一の操作で選択可能な第1の典型属性セットに設定する手段と、前記第1の分類よりも下位の分類が前記第1の典型属性セットを継承する手段と、前記下位の分類に対してさらに下位の分類に継承させる第2の典型属性セットを、前記第1の典型属性セットの少なくとも一部を用いて設定する手段とを具備する
【選択図】　図1



【特許請求の範囲】
【請求項１】
下位の分類が上位の分類の属性を継承する階層構造を持つ階層型データベース装置において、
第１の分類が有する少なくとも１つの属性を典型属性に設定し、各典型属性に対する検索条件を含む付帯情報を、一の操作で選択可能な第１の典型属性セットに設定する手段と、
前記第１の分類よりも下位の分類が前記第１の典型属性セットを継承する手段と、
前記下位の分類に対してさらに下位の分類に継承させる第２の典型属性セットを、前記第１の典型属性セットの少なくとも一部を用いて設定する手段と
を具備することを特徴とする階層型データベース装置。
【請求項２】
前記典型属性のいずれかに負の継承を設定する手段をさらに具備することを特徴とする請求項１に記載の階層型データベース装置。
【請求項３】
前記第１の分類における前記典型属性の表示順序を設定する手段と、
前記表示順序を前記下位の分類が継承する手段と、
を具備することを特徴とする請求項１又は２に記載の階層型データベース装置。
【請求項４】
前記下位の分類が継承した前記表示順序が可変であることを特徴とする請求項３に記載の階層型データベース装置。
【請求項５】
前記第２の典型属性セットに、前記第１の典型属性セットから継承した典型属性の第１の組とは異なる典型属性の第２の組を追加する手段を具備し、
前記下位の分類に対してさらに下位の分類において、前記第１の組と第２の組のいずれか一を選択可能となるように前記第２の典型属性セットを継承することを特徴とする請求項１乃至４のいずれかに記載の階層型データベース装置。
【請求項６】
階層型データベースにアクセスするユーザ又はユーザグループを登録する手段と、
前記第１の典型属性セットに基づいて、前記ユーザ又はユーザグループの各々に固有の第３の典型属性セットを設定する手段を具備することを特徴とする請求項１に記載の階層型データベース装置。
【請求項７】
前記第３の典型属性セットに、前記ユーザ又はユーザグループの各々の電子メールアドレスを関連付ける手段と、
前記第３の典型属性セットの付帯条件に含まれる検索条件を満足する新たなインスタンスの登録を検知する手段と、
前記新たなインスタンスの登録検知を前記電子メールアドレスに基づいて前記ユーザ又はユーザグループに通知する手段と
を具備することを特徴とする請求項６に記載の階層型データベース装置。
【請求項８】
前記新たなインスタンスのＵＲＩをさらに通知することを特徴とする請求項７に記載の階層型データベース装置。
【請求項９】
前記新たなインスタンスの登録検知の通知に基づく要求に応じて前記新たなインスタンスを前記ユーザ又はユーザグループに送信する手段を具備することを特徴とする請求項７又は８のいずれかに記載の階層型データベース装置。
【請求項１０】
前記新たなインスタンスの登録に対し前記検索条件に係わるいずれかの前記ユーザ又はグループを特定し、該新たなインスタンスの登録をなした情報登録者に通知する手段を具備することを特徴とする請求項７乃至９のいずれかに記載の階層型データベース装置。

【請求項１１】
下位の分類が上位の分類の属性を継承する階層構造を持つ階層型データベースの構築方法において、
第１の分類が有する少なくとも１つの属性を典型属性に設定し、各典型属性に対する検索条件を含む付帯情報を、一の操作で選択可能な第１の典型属性セットに設定するステップと、
前記第１の分類よりも下位の分類が前記第１の典型属性セットを継承するステップと、
前記下位の分類に対してさらに下位の分類に継承させる第２の典型属性セットを、前記第１の典型属性セットの少なくとも一部を用いて設定するステップと、を具備することを特徴とする階層型データベースの構築方法。

【発明の詳細な説明】
【０００１】
【発明の属する技術分野】
本発明は、分類（クラス）のもつ属性が継承される階層型データベースにおいて典型属性を設定できるものに関する。
【０００２】
【従来の技術】
マイクロソフト社（商標）のオペレーティング・システム（ＯＳ）Ｗｉｎｄｏｗｓ（商標）や、その他ＵＮＩＸ（商標）、ＬＩＮＵＸ（商標）といった汎用ＯＳにおいては、ツリー状のディレクトリー構造やファイル構造をユーザに視覚的に明示し、ユーザを特定のディレクトリーやファイルへ誘導・移動（ナビゲート）するためのグラフィック・ユーザ・インタフェース（ＧＵＩ）としてツリー表示が採用されている。
【０００３】
しかしながら、このツリー表示の各ノード間においては、上位のノードに含まれる情報（ファイル等）と下位のノードに含まれる情報との間には継承関係あるいは包含ないし部分集合関係等の関係はなく、ルート・ノードから始まるツリー上のノードは、ファイルなどの情報を納める入れ物、つまりコンテナーがツリー状に上下に接続されていることを表わしているにすぎない。この種の構造のことを、本明細書では「階層型ファイル構造」と呼び区別する。
【０００４】
オブジェクト指向データベース（ＯＯＤＢ）や関係データベース（ＲＤＢ）の部分改良型として登場したオブジェクト・リレーショナルデータベース（ＯＲＤＢ）を代表とするデータベースは、階層構造を有し、該階層構造において下位分類が上位分類の属性を継承する仕組みを有する。このようなデータベースでは、継承によって下位の分類では属性が累増するという特徴がある。下位分類が上位分類の属性を継承することは、「インヘリタンス」とも呼ばれ、このような技術は多くの文献に記載されている（例えば下記非特許文献１参照。）。なお、オブジェクト指向データベース（ＯＯＤＢ）関連の技術分野では、階層中の分類を「クラス」と呼ぶことが多い。本明細書では、「分類」と「クラス」とをほぼ同じ意味を有する用語として用いる。
【０００５】
また、オブジェクト・リレーショナル型データベース（ＯＲＤＢ）においては、継承を許したテーブルがクラスに相当する。上下関係にあるテーブル間においては、上位のテーブルから下位のテーブルへ属性が継承される。ここでの属性は、ＯＲＤＢにおいては上位テーブルを構成するコラムのヘッダー情報に相当し、これが下位テーブルへ継承される。
【０００６】
本明細書においては、オブジェクト指向データベース（ＯＯＤＢ）とオブジェクト・リレーショナルデータベース（ＯＲＤＢ）の両者を含めて「階層型データベース」と称する。また、各階層のクラスに属する同じ属性種を持つデータを「インスタンス」と呼び、その集合をデータの「ポピュレーション」と呼ぶ。
【０００７】

ポピュレーションの実装方法は様々であるが、例えばＯＲＤＢでは１つの分類について、１つまたは複数のテーブルとして実装される。複数のテーブルとして実装された場合には、テーブル間の集合演算およびＪＯＩＮによりポピュレーション全体が表現されることがある。

【０００８】

ＩＳＯ１３５８４　Ｐａｒｔｓ　Ｌｉｂｒａｒｙ規格（通称、”ＰＬＩＢ”「ピーリブ」）は、複数の”Ｐａｒｔ”（通常、「分冊」と訳される）からなる製品あるいは部品ライブラリデータに関するオブジェクト指向的な記述の方法とその交換ファイル形式のセマンティックス、すなわち、どのような用語や記述方式およびデータ型を用いるかを定める国際規格である。また、ＩＳＯ１３５８４　Ｐａｒｔｓ　Ｌｉｂｒａｒｙ規格のＰａｒｔ４２（分冊第４２）はＩＥＣ６１３６０－２（分冊第２）と内容が共通している。この規格は、オブジェクト指向的に製品を分類し、個々の分類を特徴付ける属性群を明らかにし、分類に対するコンテンツをファイル交換する仕組みであるので、勿論、属性の継承の概念はこの中に含まれている。また、この規格はＩＳＯ６５２３“Ｓｔｒｕｃｔｕｒｅ　ｆｏｒ　Ｉｄｅｎｔｉｆｉｃａｔｉｏｎ　ｏｆ　ｏｒｇａｎｉｚａｔｉｏｎｓ　ａｎｄ　ｏｒｇａｎｉｚａｔｉｏｎ　ｐａｒｔｓ”を引用して作られており、特に、ＩＳＯ６５２３の定めるＩＣＤ（Ｉｎｔｅｒｎａｔｉｏｎａｌ　Ｃｏｄｅ　Ｄｅｓｉｇｎａｔｏｒ）を活用して属性に対して世界的に一意な識別子を割り振ることが可能である。

【０００９】

【非特許文献１】

Ｏｂｊｅｃｔ－Ｏｒｉｅｎｔｅｄ　Ｃｏｎｃｅｐｔｓ，　Ｄａｔａｂａｓｅｓ，　ａｎｄ　Ａｐｐｌｉｃａｔｉｏｎｓ，　Ｅｄｉｔｅｄ　ｂｙ　Ｗｏｎ　Ｋｉｍ，　１９８９，　ＡＣＭ　Ｐｒｅｓｓ

【００１０】

【発明が解決しようとする課題】

オブジェクト指向データベースを代表とする下位が上位分類の属性を継承する階層構造を持つデータベースにおいては、属性の継承に従って下位の分類では属性が累増する構造を持つ。このため一般的なユーザが頻繁に選択に用いるその分類を代表する（典型的）属性と、それ以外の付帯的な属性、もしくは極限られた用途またはユーザグループにのみ必要となる属性の区別が難しく、工業製品の製造仕様データベースでは属性数が数百におよぶことも稀ではない。

【００１１】

したがって、製品の選択の際に属性種が数十を超える場合には、ユーザはどの属性に着目してインスタンスを選択すればよいのか、あるいはどの属性に関する情報がそのクラスにおいて、しばしば要求される典型的な情報であるかが一目瞭然ではない。例えば、工業製品の製造仕様データベースの場合には、属性がカテゴリー分けされていない場合には、属性数が多すぎるために簡単に個々の製品インスタンスの特徴を把握し、インスタンスを属性値により絞り込んで選択することが困難となる。このため、属性種をカテゴリーに分類することがしばしば行われる。

【００１２】

しかしながら、従来、そのカテゴリーの設定は分類（クラス）とは関係なく行われる（例えばＩＥＣ－６１３６０－２およびＩＳＯ１３５８４－４２においては、ＩＳＯ－３１に基づく属性のカテゴリー分けを記述する）か、あるいは、分類毎に設定される場合でも単純に前述の階層構造を持つデータベースそのものが持つ継承機構に依存して継承され、この継承機構に対して独立にかつ選択的に継承することができなかった。

【００１３】

したがって、階層型データベースの分類に関連付けて典型属性を設定するための新たな概念が必要とされており、さらには、典型属性を保存するデータベースの構造、および典型属性に対する検索条件を保存する仕組み、さらには検索条件に合致するインスタンスをユーザに提示する仕組みが求められている。しかしながら、これらの事項はＩＳＯ１３５８

４規格やＩＥＣ６１３６０規格およびＩＳＯ６５２３のスコープからは外れており、これまでに提供されていない。

【００１４】

本発明はかかる事情を考慮してなされたものであり、階層型データベースの分類に関連付けて典型属性を設定することのできる階層型データベース装置を提供することを目的とする。

【００１５】

【課題を解決するための手段】

本発明に係る階層型データベース装置は、下位の分類が上位の分類の属性を継承する階層構造を持つ階層型データベース装置において、第１の分類が有する少なくとも１つの属性を典型属性に設定し、各典型属性に対する検索条件を含む付帯情報を、一の操作で選択可能な第１の典型属性セットに設定する手段と、前記第１の分類よりも下位の分類が前記第１の典型属性セットを継承する手段と、前記下位の分類に対してさらに下位の分類に継承させる第２の典型属性セットを、前記第１の典型属性セットの少なくとも一部を用いて設定する手段とを具備することを特徴とする。

【００１６】

本発明に係る階層型データベースの構築方法は、下位の分類が上位の分類の属性を継承する階層構造を持つ階層型データベースの構築方法において、第１の分類が有する少なくとも１つの属性を典型属性に設定し、各典型属性に対する検索条件を含む付帯情報を、一の操作で選択可能な第１の典型属性セットに設定するステップと、前記第１の分類よりも下位の分類が前記第１の典型属性セットを継承するステップと、前記下位の分類に対してさらに下位の分類に継承させる第２の典型属性セットを、前記第１の典型属性セットの少なくとも一部を用いて設定するステップと、を具備することを特徴とする。

【００１７】

【発明の実施の形態】

以下、図面を参照して本願発明の実施形態を説明する。

【００１８】

図１は、本発明に係る階層型データベース装置の一実施形態に係るシステムの概略構成を示すブロック図である。本システムは、インターネット６を介したウェブ（ＷＷＷ）ベースのシステムであり、ウェブ・クライアント５側とウェブ・サーバ７側とに構成要素を区分することができる。本発明に相当するのはウェブ・サーバ７側のシステムである。なお、このようなネットワーク通信を伴うクライアント・サーバ方式のみに本発明は限定されないことはいうまでもない。

【００１９】

ウェブ・クライアント５は、マウス１、キーボード２、ディスプレイ３、ＧＵＩ４を備え、汎用のコンピュータを用いて構成される。ウェブ・クライアント５はウェブサーバ７から受信したデータをＧＵＩ４を介してディスプレイ３に出力し、またＧＵＩ４を介してユーザよりキーボード２およびマウス１等のポインティング・デバイスからデータやコマンドを受取り、ウエブ・サーバ７へ送信する。

【００２０】

ウェブ・サーバ７は、ウェブ・クライアント５と同様にマウス９、キーボード１０、ディスプレイ１１、ＧＵＩ１２を備え、汎用のコンピュータを用いて構成することができる。さらに、ウェブ・サーバ７は、「辞書」と別称されるクラス分類とクラス分類を構成する属性のデータベース１６、「コンテンツ」と別称される個々のクラスの属性の値の組すなわちインスタンスのデータベース１５、クラス分類の典型属性のデータベース１７を備える。また、これらデータベース１５，１６，１７へのデータの入出力および検索の実行を管理するデータベース・マネージメント・システム８を備える。

【００２１】

典型属性のデータベース１７はキーボード１０からの入力により設定、構築することが可能であるが、これを簡単に初期設定するために、典型属性のデータベース１７とは別に、

典型属性の設定用の外部ファイル１３もしくは典型属性設定テーブル１４を利用することができる。

【００２２】

辞書、すなわちクラス分類とクラス分類を構成する属性のデータベース１６には、クラス相互間についての情報が記録されており、１つのクラス分類を選んだときその上位分類クラス（スーパークラス）とその下位分類クラスが分かるようになっている。また、この辞書データベース１６にはクラス分類に所属する属性に関する情報が記録されており、１つのクラス分類を選んだときそのクラスに付属する全ての属性に関する情報が分かるようになっている。

【００２３】

典型属性のデータベース１７には、各々のクラスに所属する典型属性に関する情報が記録されており、１つのクラス分類を選んだときそのクラスに付属する全ての典型属性の組およびその個々の組を構成する全ての属性が分かるようになっている。

【００２４】

本実施形態は、ある分類についてそれを代表するような属性を１組あるいは数組の典型属性にまとめ、この組を各階層が（負の継承を含めて）継承し、さらに個々の階層において典型属性に対する代表的な検索条件値も含め「ティピカル・プロパティセット」として１種のクラスとして纏めて継承するようにし、このティピカル・プロパティセットへの追加や削除、あるいは条件の変更を分類クラス単位で可能にするものである。また、この組に対応するＧＵＩ上の要素、例えばボタン等をユーザが選択することで、ティピカル・プロパティセットの１つに属する属性に関する情報や検索値入力欄を表示させ、分類中のインスタンス・データ選択の容易化を狙っている。

【００２５】

クラスの典型属性とその検索条件を合わせてなるティピカル・プロパティセットには、検索条件の他に使用例、入力例、補足説明などの付帯的な情報を含むことができるものとする。このうち、検索条件のみを「クエリー・コンディションセット」と呼ぶ。なお、このティピカル・プロパティセットの概念は関係データベース（ＲＤＢ）における検索の主キー（プライマリー・キー）あるいは索引（ＩＮＤＥＸ）の概念とは異なり、これらと独立である。また同じ組に属する属性間に配置・表示順の指定がないならば、すなわち典型属性の組に属するということのみでは、特定の表示または継承上の順番は与えられない。また個々のプロパティセットは独立である、つまり１つの属性が複数のティピカル・プロパティセットに出現することがあり得る。

【００２６】

図２は、本実施形態の階層型データベースにおけるクラス分類と属性と典型属性および検索条件の関係、すなわち、クラス分類間の関係、クラス分類と属性の関係、クラス分類と典型属性の関係、および典型属性と検索条件の関係を表現する構造を模式的に示したものである。すなわち、全体のクラス分類の頂点であるルートクラス以外において常に上位クラス分類を辿ることが可能であり、クラス分類は上位クラス分類より上位クラス分類の持つ属性、典型属性の組、すなわちその属性の１つまたは複数個からなる属性のグループ、およびその典型属性の組に対応する検索条件を継承する。従って、本実施形態においては典型属性の組に対応する検索条件そのものも１つのクラスをなすとみなすことができる。

【００２７】

＜検索条件の継承＞

本実施形態では、上述のように属性の継承のみならず検索条件の継承をも可能にする。すなわち、ある特定分類の検索に使うような代表的な典型属性に関しては、その属性値に対する検索条件や検索条件の範例も典型的であり、下位の分類においては上位の分類の代表的な属性群に対する検索条件値を継承して使用可能な場合が多い。しかしながら、従来の階層型データベースでは、このような検索条件はあくまでもユーザが代入すべきものであり、属性のように継承されるものではなく、これをディフォルトの検索条件として下位クラスへ継承する仕組みを持っていなかった。

【００２８】
さらにこの代表的な属性の組とそれに対する検索条件、およびそれを設定した個々のユーザの識別子あるいはそのユーザの所属するグループの識別子を関係付け、これを保存しておいて、後に再度ユーザもしくはその所属するグループの何れかのユーザが、その分類についてインスタンスを検索しようとする際に、ユーザもしくはその所属するグループの保有する識別子に対応する適切な典型属性もしくは典型属性と検索条件の組をユーザに提示する仕組みを備えたものは無かった。この検索条件の継承は、オブジェクト指向プログラミング言語で普通に提供されるメモリ上の異種のデータ型の変数の集約化およびカプセル化をあらわすＣ＋＋言語やＪａｖａ言語の「クラス」の属性の継承およびその初期化とは異なり、データベースとしての検索条件に関わるもので異なる概念である。

【００２９】
＜負の継承＞
本実施形態は、新たな下位分類（サブクラス）を設けたとき、この下位分類へ係る典型属性について負の継承を行うことにより、この属性を消失させることによる効果を狙っている。

【００３０】
オブジェクト指向データベースを代表とする下位が上位分類の属性を継承する階層構造を持つデータベースにおいては、継承に従って下位の分類では属性が累増する構造を持つ。ところが、実際の製品や生物の分類においては、技術の発展にともない、あるいは生物の進化にともない、ある階層を起源としてそれ以降、その階層以前（上位）の分類において上位にあった特徴や性質が消失することがあり、これを従来のオブジェクト指向データベースの概念および階層型データベースでは適切に表現することができなかった。

【００３１】
例えば、従来の家庭用電気掃除機には電源ケーブルがあり、常に電源と掃除機は常時電源ケーブルで結ばれていた。しかし最近では操作性の向上のために電源ケーブルが消失し蓄電池から供給される電気を動力に変えてモータを駆動する掃除機が存在する。また家庭用のアイロンにおいても、現在は電源とアイロンのホルダー間に電源ケーブルはあるが、実際に衣類に当てる本体には電源ケーブルのない蓄熱型のものが存在する。これらは電気掃除機の発展形として分類されるものであるが、従来の電気掃除機やアイロンでは電源ケーブルの存在は必要不可欠と思われていたために、上位分類となる電気掃除機やアイロンの分類において電源ケーブルという属性が生じるのが普通である。

【００３２】
また自動車には、その燃料として使用するものがガソリンであれディーゼル油であれある種の内燃エンジン（ｃｏｍｂｕｓｔｉｏｎ　ｅｎｇｉｎｅ）を必要とするが、環境に配慮した最近の電気自動車には内燃エンジンが存在しない。この時、例えば自動車に固有の属性とされる「内燃エンジン種類」を除去し、下位の分類例えばセダン等で改めて「エンジン種類」として設けるならば、問題を可避できるが、種類を問わず多くのデータベースにおいては、一度分類に固有の属性が定義されると、その属性に従ってインスタンス・データが入力され蓄積されるため、事後に分類から属性を削除することはデータベースの管理上大きな問題を引き起こすことが多い。

【００３３】
本実施形態では、典型属性について、上記の新しい属性の継承の仕組、すなわち負の継承、を取り込めるように設定を行えるよう構成される。すなわち、属性の消失を意味する負の属性については、その分類においてその負の属性が典型属性に組み入れられたということは、それより下位の分類の該当する典型属性の組においては、実際に効果を持つ属性としては継承されない、あるいは、存在しても効果を持つものとして扱われないという特殊性を持つ。

【００３４】
図３は、複数のユーザの各々に典型属性組および検索条件（クエリー・コンディションセット）が対応付けられている場合を示す図である。

【００３５】
本実施形態では、ユーザＡ，Ｂ，Ｃに対し３つの典型属性の組Ａ、Ｂ、Ｃが対応付けられている。これら典型属性の組Ａ、Ｂ、Ｃは上位の分類クラス１から継承したものである。図３において、属性および検索条件を示す楕円のうちドットで塗りつぶされたものが上位の分類クラス１から分類クラス２へ継承される典型属性およびその検索条件である。ユーザもしくはユーザの所属するグループの識別子とこのティピカル・プロパティセットを関連付け、ユーザがユーザ識別子もしくはユーザの所属するグループの識別子に応じて、表示選択できるティピカル・プロパティセットを限定する。
【００３６】
＜電子メール通知＞
このティピカル・プロパティセットとユーザあるいはユーザの所属するグループを関連付ける情報の中に、電子メールアドレスあるいは郵便のあて先を加え、ティピカル・プロパティセット中に記載された検索条件に合致するインスタンスが新たに登録された場合に、電子メールアドレスを利用して登録されたユーザもしくはユーザグループに属する全てのユーザへ自動的に電子メールで通知する、あるいは郵便にて通知することができる。
【００３７】
ユーザがデータベースの検索時にユーザの望む条件に合致するインスタンスが見つからず、事後に、条件を満たすインスタンスが、ユーザが検索対処とした分類クラス、あるいはその下位分類クラス（サブクラス）において登録されることがある。本実施形態では、ユーザ毎に検索条件を登録することにより、新たにインスタンスが登録された際に、既存のユーザの検索条件をこれらのインスタンスに適用することにより条件に合致するものの有無を調べ、合致するものがあった場合にはその旨を登録されたユーザに通知することにより、この問題を解決する。このような条件を満たすインスタンスを必要とするのは人間のユーザに限らず、他のデータベースやアプリケーション等のソフトウェアである場合もある。
【００３８】
データベースあるいはアプリケーションをユーザとして、特定の電子メールアドレスをデータベースに設定することにより、随時条件を満たす新たなインスタンス・データが情報提供者により登録された場合には、その旨の通知を電子メールで受信することにより、随時インスタンスを補充できるようにする。
【００３９】
図４においてはテーブルを利用して、図３に示す分類クラス２に対するユーザＡに「○△株式会社営業」というユーザグループ、Ｂに「Ｗｉｌｌｉａｍ　Ｓｈａｋｅｓｐｅａｒ」、「Ｔｈｏｍａｓ　Ｍａｎｎ」、「森鴎外」の３名の架空のユーザ、Ｃに「利用者Ｃ」１名の電子メールアドレスが関連付けられている。また図５は、図４の電子メールアドレスと典型属性の関連付けを図示したものである。
【００４０】
ティピカル・プロパティセット中に記載された検索条件に合致するインスタンスが新たに登録された場合にユーザへ通知する電子メールの中に、合致するインスタンスのＵＲＩ（Ｕｎｉｖｅｒｓａｌ　Ｒｅｓｏｕｒｃｅ　Ｉｄｅｎｔｉｆｉｅｒｓ）を含めることにより、通知を受けたユーザをそのインスタンスの表示された画面へ直接誘導する。もともと多くの既存のアプリケーションにおいて、ＵＲＩはその文字列をクリックするだけでインターネットを介してＣＧＩやサーブレットを駆動し、そこに記載されたファイルの内容を呼び出したり、更にスクリプトまたはプログラムを駆動して情報をユーザのウェブブラウザに表示させることが可能になっている。
【００４１】
本実施形態では、ティピカル・プロパティセット中に記載された検索条件に合致するインスタンスが新たに登録された場合に通知するあて先に他のインタネットアドレス上に設置された他のデータベースやアプリケーションがプログラムより直接利用することのできる電子メールアドレスを含め、そこに電子メールを送付することによるか、もしくは、後者

のデータベースが電子メールの内容を間接的にアクセスできる電子メールアドレスに電子メールを送付することにより、自動的に検索条件に合致するインスタンス・データの更新を通知し、さらに後者のデータベースやアプリケーションにおける自動的なデータの更新を実現する。

【００４２】

情報登録者がデータベース１５に新たなインスタンスを登録した際に、ティピカル・プロパティセット中に記載された検索条件に合致するインスタンスが存在した場合、そのインスタンスを提供した情報登録者にインスタンス中に属性値の一つとして与えられた、あるいはインスタンスに関連して別に用意された電子メールアドレス（例えばインスタンス中の属性の文字列値でＵＲＩを指定されたファイル中に記載された電子メールアドレス）を用いて電子メールで通知することにより、インスタンス情報のユーザと情報提供者のマッチングを行う。図６に情報登録者と情報利用者のマッチング（照合）のモデルを示す。なお、情報提供者側の電子メールアドレスを記述する属性そのものは、特に典型属性に含まれている必要はない。

【００４３】

なお階層型データベースの場合には上位で設けた属性が下位に継承されるため、上位の分類クラスで継承属性の一つとして、「情報提供者電子メールアドレス」に相当する属性を例えば文字列型として設けておけば、下位の分類クラスでもこの属性を持つことになる。従って、下位の分類クラスの各インスタンスはこの属性に対する電子メールアドレスの文字列値をそれぞれ持っていることになる。

【００４４】

特に「情報提供者電子メールアドレス」に相当する属性の識別子として、ＩＳＯ　１３５８４　Ｐａｒｔｓ　Ｌｉｂｒａｒｙ　ＳｔａｎｄａｒｄのＰａｒｔ４２（第４２規格分冊）に定めるＢＳＵ（ＢａｓｉｃＳｅｍａｎｔｉｃ　Ｕｎｉｔ）と呼ばれる標準コード記述の方法を用いる場合には、このコードがＩＳＯ　６５２３　Ｉｎｔｅｒｎａｔｉｏｎａｌ　Ｃｏｄｅ　Ｄｅｓｉｇｎａｔｏｒ（ＩＣＤ）を介して世界で一意になる構造を持っているため、情報提供者電子メールアドレスという属性に対して１つのＢＳＵ（すなわちこの場合はプロパティＢＳＵ、あるいはＰｒｏｐｅｒｔｙ＿ＢＳＵ）コードを割り振り、データベース・システムに対してそのコードを電子メール送信に用いるものとして認識させ、この辞書を標準辞書として公開することにより、本実施形態の階層型データベースを用いるならば、この辞書の定義を引用して作成される世界の全ての製品分類辞書に対するインスタンス・データに関して、電子メールによる情報利用者と情報提供者のマッチングのメカニズムが等しく有効になる。

【００４５】

＜リスト＞

本実施形態では、各分類より参照することのできるリストであって、その個々を識別子（名前またはコード）で区別することの可能なものを１つまたは複数用意する。リストの要素としては、その分類に設けられるティピカル・プロパティセットに属するプロパティ属性の識別子、その表示あるいは配置上の順番およびその検索条件の値を記述するものとする。このリスト構造は図３に対応している。このリストの保存の形態としては、ファイルではなく、例えば図７に示すように関係データベースのテーブルであっても良い。検索条件は属性に応じて存在する場合と存在しない場合がある。検索条件の中には、値を挟みこむ検索条件を記述することもできる。図８は、分類クラス２に関して図７のテーブルの記載する内容を纏めたものである。

【００４６】

表示あるいは配置上の順番については、リストを用いた場合にはリストに記載の順番をディフォールトの表示順番として用いることができるが、ディフォールトの状態としてはリスト中に記載の順番は特に表示あるいは配置上の順番を表すものとせず、別に属性に整数等を付記して表示あるいは配置上の順番を指定しても良い。図７の関係データベースのテーブルのそれぞれの行間には事前に決定された特定の順番は無いため、別に「描画順位」

コラムにおいて、順番を表す整数型あるいは文字列型の列を設けることにより表示あるいは配置上の順番を表している。

【００４７】

このティピカル・プロパティセットのリストの初期設定の方法としては、図１に示した設定ファイル１３を参照することにより生成するか、またはハードディスク等の二次時記憶上に存在する典型属性設定用のデータベース１４より各分類に対する設定を読みこんで、それぞれの分類に対してティピカル・プロパティセットを決定すればよい。

【００４８】

この際、上位分類クラスに対する設定ファイルから生成され下位分類に継承される典型属性に関するティピカル・プロパティセットのリストの内容と、実際の下位分類クラスに対する設定ファイルの内容が異なることがある。この場合には、まず上位より継承される設定ファイルの内容を用いてティピカル・プロパティセットのリストの内容を仮決定し、次に下位分類クラスの設定ファイル中に定めるティピカル・プロパティセットのリストの内容を仮決めしたティピカル・プロパティセットのリストに加えるか、あるいは、上位と内容と下位の内容が異なる場合には、相当する上位の内容を下位の内容で上書きすればよい。もしくは、下位分類クラスに対する設定ファイルの内容でティピカル・プロパティセットのリストの内容を仮決めし、この設定ファイル中に記述されていない属性について、上位のティピカル・プロパティセットのリストの内容を引き写せばよい。この際、負の継承を示す典型属性については、予めその旨、例えば図７に示すようにテーブル中の「継承の正負」コラムにおいて　“ＦＡＬＳＥ”とマークづけされているので、引写されなければよい。

【００４９】

この方式により、順次下位分類クラスにおいて上位のティピカル・プロパティセットより継承された内容の上書きが可能になる。

【００５０】

このようにして決定した、各ティピカル・プロパティセットに従ってティピカルプロパティの配置および表示順が決定される。このティピカル・プロパティセットのリストの内容については、最終的にハードディスク等の二次記憶装置またはファイル中に記載し格納することにより、毎回ユーザが用意する設定ファイルからティピカル・プロパティセットのリストの内容を決定する手間を省くことが可能になる。

【００５１】

図９は、配置・表示の順番が、属性名あるいは識別子の出現順番である場合の設定ファイルを用いたクラスに対するティピカルプロパティの設定の手順を示すフローチャートである。出現順番が数字で指定されている場合には、それを読み取って最初に出現順に並び替えることにより一般的に処理できる。まずステップＳ１において、設定ファイルから当該クラスについての典型属性、検索条件および付帯情報を読み込む。ステップＳ２において検索条件の有無を判断する。検索条件が有りの場合はステップＳ３において検索条件を典型属性リスト（ティピカル・プロパティセットのリスト）に書き込む。また、ステップＳ４において負の継承の有無を判断する。負の継承がある場合には、ステップＳ５において、負の属性を有する属性にマークを付与する。そして、ステップＳ６では、上位の分類クラスについて、負の継承を持つもの以外の他の属性に関する設定を現在の典型属性リストに加える。

【００５２】

＜マッチング＞

上述したように、条件を満たす新たなインスタンス・データが情報提供者により登録された場合には、随時、その旨の通知を検索条件の登録者のみではなく、インスタンス中の属性、あるいはその関連情報として記載された情報登録者の電子メールアドレスを認識し、そのアドレスへの電子メールを送信することにより、情報の利用者と提供者のマッチング（照合）を可能にする。

【００５３】

この電子メールアドレスを属性として認識する場合において、階層型データベースの辞書について特にＩＳＯ１３５８４に準拠した標準コード方式が用いられる場合にはＩＳＯ６５２３に基づき個々の情報コード体系の発行組織を一意に識別するＩＣＤと呼ばれる４桁の発行団体コードが、個々の情報コード体系中の企業・団体コードを修飾し、さらにこの企業・団体コードが企業・団体内で有効な個々の分類コード、属性コードを修飾するため、ＩＳＯ世界で一意に分類やそれに所属する属性を識別することが可能である。

【００５４】

またＩＳＯ１３５８４では、他の団体や企業の作った分類体系すなわち辞書を他の辞書中に部分的または全て引用（以下ではインポートと呼ぶ）して使う仕組みがあり、辞書中の上位分類でインポートした属性は下位分類へ継承される。

【００５５】

本実施形態においては、ある標準辞書、甲で定めた情報登録者の電子メールアドレスとして用いる属性の識別子（プロパティＢＳＵ）を一旦設定しシステムに認識させておくならば、別な分類体系を記述する辞書乙を使用する際にも、甲の辞書の電子メールアドレスの記述されている属性をかなり上位の分類において乙に輸入（インポート）することにより、その場限りの特殊で実装依存の属性の識別方法を用いることなく、また表面的な属性名称の異同に煩わされることなく、甲の標準コードを用いて電子メールアドレスの表記されている属性を特定することができる。

【００５６】

図１０は、条件に合うインスタンスの情報を利用者に通知し、情報利用者と情報提供者とのマッチングの手順を示すフローチャートである。この手順においては、まず新しいインスタンスが分類クラスに登録され、分類クラスが更新される（ステップＳ１）。次に、新しいインスタンスが登録された分類クラスを検知、特定する（ステップＳ２）。次に、登録された分類クラスに対し、電子メールアドレスが関連付けられたティピカル・プロパティセットの有無を判定する（ステップＳ３）。該ティピカル・プロパティセットが存在しない場合、インスタンスの新規登録を通知するあて先が無いから、処理を終了する。ステップＳ３において電子メールアドレスが関連付けられたティピカル・プロパティセット有りと判定された場合、新インスタンスが検知された分類に対するティピカル・プロパティセットを収集する（ステップＳ４）。次に新インスタンスのいずれかが収集されたティピカル・プロパティセットのクエリー・コンディションを満たすか判定する（ステップＳ５）。クエリー・コンディションを満たさない場合は処理を終了する。満たす場合はクエリー・コンディションセットに規定されている検索条件を満たすインスタンスの識別子又はこれに掲載された仕様情報を収集して保存する（ステップＳ６）。次に、条件を満たすティピカル・プロパティセットのクエリーコンディションに関連する電子メールアドレスを収集し、インスタンスの識別子又はこれに掲載された仕様情報を内容とする電子メールを作成する（ステップＳ７）。ステップＳ８において、作成された電子メールを、前記収集した電子メールアドレス宛てに発信（送信）する。さらに、情報提供者にこれを通知する場合（ステップＳ９）は、インスタンスの仕様情報の少なくとも一部またはそれに関連する情報として事前に設定された情報登録者の連絡先に、顧客（見込み客）の電子メールアドレスを含む引き合い情報を記載した電子メールを送信する。

【００５７】

図１１は、典型属性を１組持つ階層型データベースのＧＵＩの例を示す図である。すなわち、分類に付随して画面にティピカル・プロパティセットの１つが表示されている。図１１中で上方に「ＴＹＰＩＣＡＬ」と表示されたボタンをマウスでクリックすることにより、この分類クラス中の典型属性を全て一度に選択できるようになっている。図中では流量計に対する属性が示されており、これには百個以上の多数の属性があり、どれが典型属性であるかを判断しにくいが、「ＴＹＰＩＣＡＬ」ボタンによれば、典型属性を自動的に選択できるのでユーザの操作負担を軽減できる。

【００５８】

「ＴＹＰＩＣＡＬ」ボタンの下に表示されているのは、個々の属性の名称とその選択ボタ

ンである。この分類クラスにおいて典型属性に設定されているものについては、正方形ボタンの表示色を異ならせるなどして他の属性と区別可能に表示することが好ましい。

【００５９】

図１２は、複数の典型属性の組を持つ階層型データベースのＧＵＩの例を示す図である。ここでは、典型属性の組が３つ設けられている。

【００６０】

図１３は典型属性設定ファイルの記述例を示す図である。これは、典型属性組を１組持つ場合に相当する。この典型属性設定ファイルには、分類および属性は全てＩＳＯ１３５８４（および一意性についてはＩＳＯ６５２３）で形式が規定されている情報の提供者に対する識別子分類に対する世界で一意となる識別子（Ｓｕｐｐｌｉｅｒ＿ＢＳＵ）Ｃｌａｓｓ　ＢＳＵ）および属性に対する識別子（Ｐｒｏｐｅｅｒｔｙ　ＢＳＵ）により記述されている。例えば図１３には、

ＳａｎｄＳ＿Ａｌｌ３．９９９９／ＩＥＣＲＯＯＴ．ＡＡＡ００１．ＡＡＥ７５２　３００＜＝Ｖａｌｕｅ＜＝８００

ＳａｎｄＳ＿Ａｌｌ３．９９９９／ＩＥＣＲＯＯＴ．ＡＡＡ００１．ＪＣＩＥ００２　Ｖａｌｕｅ＝％ｔｏｓｈｉｂａ％

ＳａｎｄＳ＿Ａｌｌ３．９９９９／ＩＥＣＲＯＯＴ．ＡＡＡ００１．ＪＣＩＥ００３　６＜＝Ｖａｌｕｅ

と記述されているが、このうち、ＳａｎｄＳ＿Ａｌｌ３．９９９９／ＩＥＣＲＯＯＴが情報の提供者を表わす識別子であり、ＡＡＡ００１が分類クラスの識別子であり、ＡＡＥ７５２、ＪＣＩＥ００２、ＪＣＩＥ００３はそれぞれ分類ＡＡＡ００１が持つ異なる３つの属性の識別子を表している。

【００６１】

また、「３００＜＝Ｖａｌｕｅ＜＝８００」は数値型の属性ＡＡＥ７５２に対する範囲を指定した検索条件の指定例である。同様に、「Ｖａｌｕｅ＝％ｔｏｓｈｉｂａ％」は、文字列型の属性ＪＣＩＥ００２に対する検索条件で、値として“ｔｏｓｈｉｂａ”を含む文字列を意味する。一方、「６＜＝Ｖａｌｕｅは、数値型の属性ＪＣＩＥ００３に対する値が６に等しいか大きいものを探すという、片方の範囲を指定した検索条件の指定の例である。

【００６２】

図１４、図１５は典型属性の組を一つだけ設けた例の異なるＧＵＩ例である。図１４は工業計器に対するプロパティセットの内容すなわち典型属性と検索条件を示し、図１５は工業計器の直下の下位文類クラスである流量計における典型属性組（プロパティセット）の内容を示している。また、図１６はこの２つのクラスに対する設定ファイルの例を示している。

【００６３】

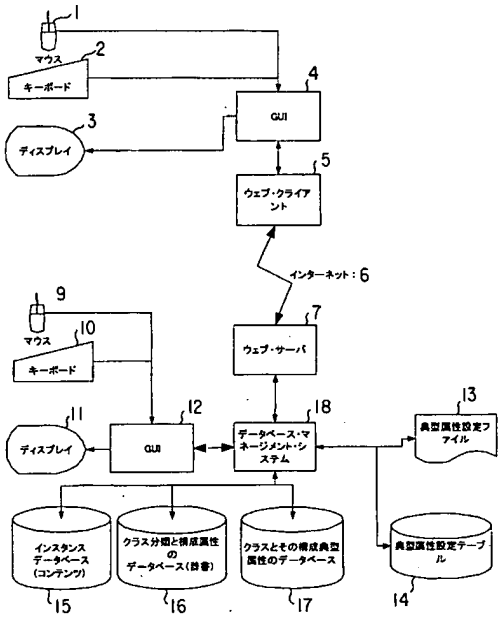
図１５のリスト中に太字イタリックで示すように、工業計器においては、ＡＣ電源電圧（プロパティＢＳＵはＪＥＭＩＭＡ＿Ｐ０００００１４）および企業名（プロパティＢＳＵはＸＪＥ０１１）が典型属性として定義され、ＡＣ電源電圧については、ＭＩＮ値が８０～８５の間に納まるものを検索条件として設定している。また企業名については文字列で「東芝」を指定している。また、記述はこの分類クラスで新たに設けられる典型属性についてのみ与えている。そのため、ＡＣ電源電圧（同ＪＥＭＩＭＡ＿Ｐ０００００１４）および企業名（同ＸＪＥ０１１）の描画順序は、工業計器の上位分類クラスである計測器から継承される全ての典型属性の末尾に加わるような記述になっている。ところが、工業計器の下位分類クラスである流量計では、工業計器より継承される属性全てに対して陽に描画順番を与えており、更に企業名の検索条件の指定を外し、ＡＣ電源電圧については、ＭＩＮ値が９０～１００の間に納まるものを新たに検索条件として設定し直している。

【００６４】

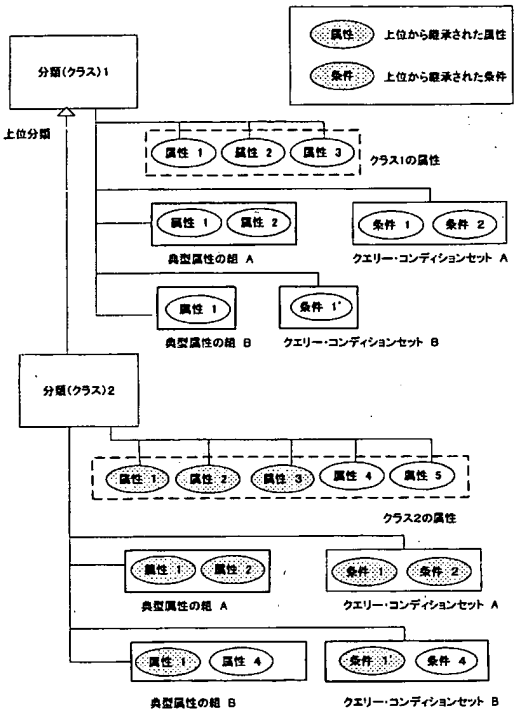
図１４、図１５において表示されている典型属性の描画順序（位置）およびその検索条件を新ためて確認するならば、設定ファイルの内容が正しく典型属性および検索条件に設定

されていることが分かる。
【００６５】
なお、本発明は上述した実施形態に限定されず種々変形して実施可能である。
【００６６】
【発明の効果】
以上説明したように、本発明によれば、階層型データベースの分類に関連付けて典型属性を設定することのできる階層型データベース装置を提供できる。
【図面の簡単な説明】
【図１】本発明に係る階層型データベース装置の一実施形態に係るシステムの概略構成を示すブロック図
【図２】分類（クラス）、属性、典型属性および検索条件（クエリー・コンディションセット）の関係を示す図
【図３】複数のユーザの各々に典型属性組および検索条件（クエリー・コンディションセット）が対応付けられている場合を示す図
【図４】典型属性と電子メールアドレスとを関連付けた例を示す図
【図５】電子メールアドレスと典型属性の組を結びつけた例を示す図
【図６】情報登録者と情報利用者の照合のモデルを示す図
【図７】典型属性を格納するテーブルの一例を示す図
【図８】分類クラス２に対する継承属性を含む各典型属性組に関連付けられた検索条件の例を示す図
【図９】クラスに対するティピカルプロパティの設定手順を示すフローチャート
【図１０】情報利用者と情報提供者とのマッチングの手順を示すフローチャート
【図１１】典型属性を１組持つ階層型データベースのＧＵＩの例を示す図
【図１２】複数の典型属性の組を持つ階層型データベースのＧＵＩの例を示す図
【図１３】典型属性設定ファイルの記述例を示す図
【図１４】上位分類クラス「工業計器」に対するプロパティセットの画面表示例を示す図
【図１５】下位分類クラス「流量計」に対するプロパティセットの画面表示例を示す図
【図１６】図１４、１５に対する典型属性の設定ファイルの例を示す図
【符号の説明】
１，９…マウス
２，１０…キーボード
３，１１…ディスプレイ
４，１２…ＧＵＩ（グラフィカル・ユーザ・インターフェース）
５…ウェブ・クライアント
６…インターネット
７…ウェブ・サーバ
８…データベース・マネージメント・システム
１３…典型属性設定ファイル
１４…典型属性設定テーブル
１５…インスタンスデータベース（コンテンツ）
１６…クラス分類と構成属性のデータベース（辞書）
１７…クラスとその構成典型属性のデータベース

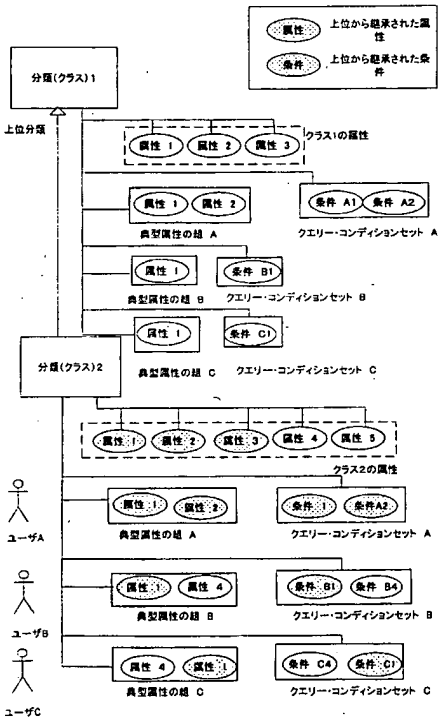
【図１】



【図２】



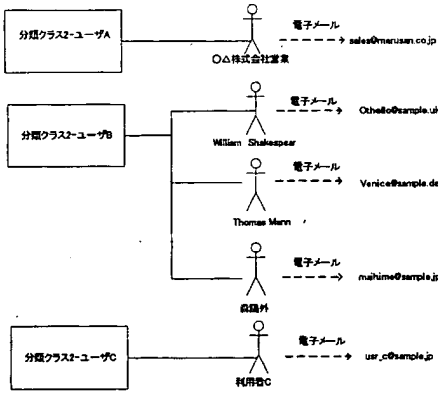
【図３】



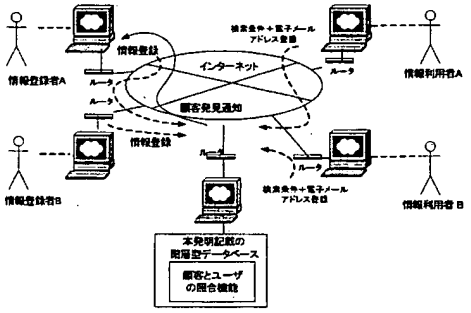
【図４】

定義クラス識別子	典型属性組識別子	ユーザ／グループ名	電子メール
分類クラス１	A	○△株式会社営業	sales@marusan.co.jp
分類クラス１	B	山田太郎	taro@sample.jp
分類クラス１	B	山田花子	hana@sample.jp
分類クラス１	C	□○株式会社営業	sales@kakumaru.co.jp
分類クラス２	B	William Shakespear	Othello@sample.uk
分類クラス２	B	森鷗外	maihime@sample.jp
分類クラス２	B	Thomas Mann	Venice@sample.de
分類クラス２	A	○△株式会社営業	sales@marusan.co.jp
分類クラス２	C	利用者C	usr_c@sample.jp

【図５】



【図６】



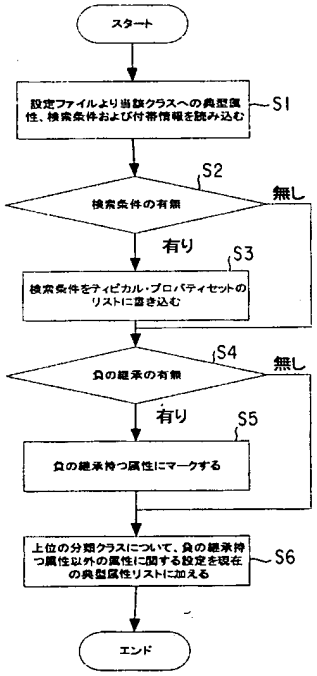
【図７】

定義クラス識別子	典型属性組識別子	属性の識別子	描画順位	継承の正負	検索条件（例）
分類クラス１	A	属性１	1	TRUE	1< Val < 2
分類クラス１	A	属性２	2	TRUE	Val = 3
分類クラス１	B	属性１	1	TRUE	1< Val < = 4
分類クラス１	C	属性１	1	TRUE	Val=5
分類クラス２	B	属性４	2	TRUE	Val="○△株式会社"
分類クラス２	C	属性４	2	TRUE	Val= "□○製作所"

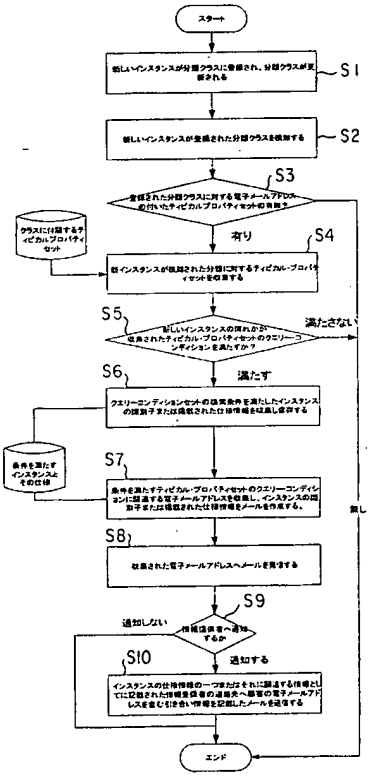
【図８】

分類クラス	典型属性組	属性	検索条件
分類クラス２	A	（継承）属性１	1< Val < 2
		（継承）属性２	Val = 3
	B	（継承）属性１	1< Val < = 4
		属性４	Val= "○△株式会社"
	C	（継承）属性１	Val = 5
		属性４	Val= "□○製作所"

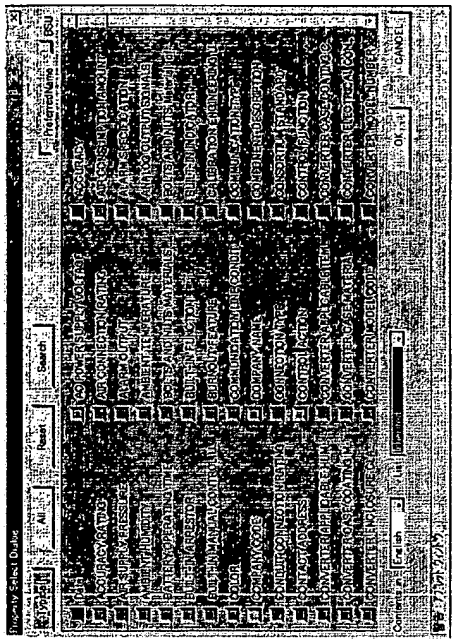
【図９】



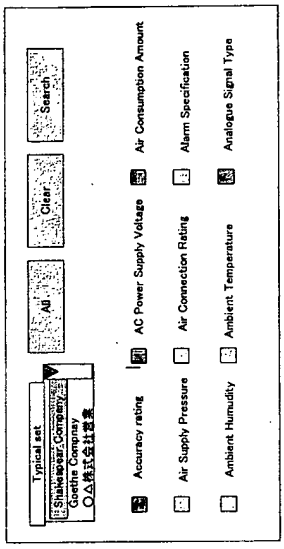
【図１０】



【図１１】



【図１２】



【図１３】

```
# Typical データ設定用のサンプルファイル
#
#

PROJECT SandS
# COMPONENTS クラスを対象
SandS_A113.9999/IECROOT.AAA001.AAE752 300<=Value<=800
SandS_A113.9999/IECROOT.AAA001.JCIE002 Value=%toshiba%
SandS_A113.9999/IECROOT.AAA001.JCIE003 6<=Value

# MOTORS クラスを対象
SandS_A113.9999/IECROOT.AAA160.JCIMTE011 0<=Min 999<=Max<=1000
SandS_A113.9999/IECROOT.AAA160.AAE752 Value<=700
SandS_A113.9999/IECROOT.AAA160.JCIMTE008
SandS_A113.9999/IECROOT.AAA160.JCIE004

# FLOW METER クラスを対象
SandS_A113.9999/IECROOT.JCIFM001.JCIFME009 Value<=0.25
SandS_A113.9999/IECROOT.JCIFM001.JCIFME006 Value=m3/h
SandS_A113.9999/IECROOT.JCIFM001.JCIFME028

# LOW VOLTAGE THREE PHASE NP ENCLOSURE CAGE INDUCTION MOTORS クラスを対象
SandS_A113.9999/IECROOT.JCIMT023.JCIMTE032
SandS_A113.9999/IECROOT.JCIMT023.JCIMTE005 Value=true

# CALS3-CV クラスを対象
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END
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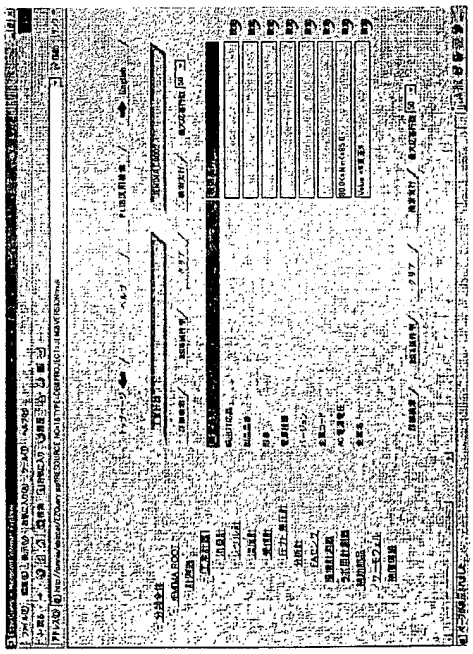
【図１４】



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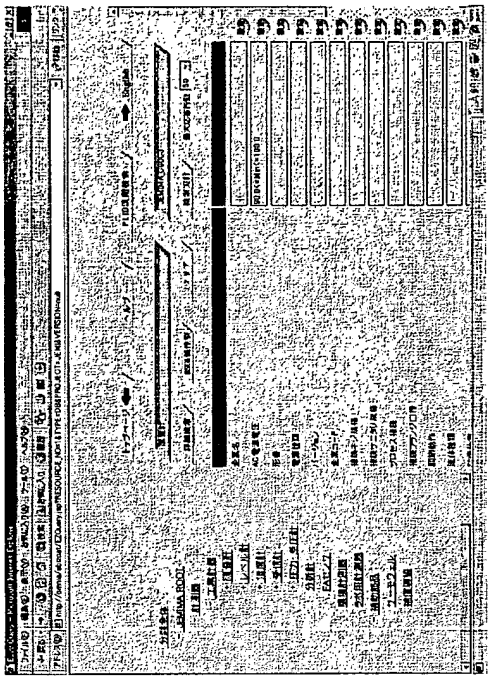
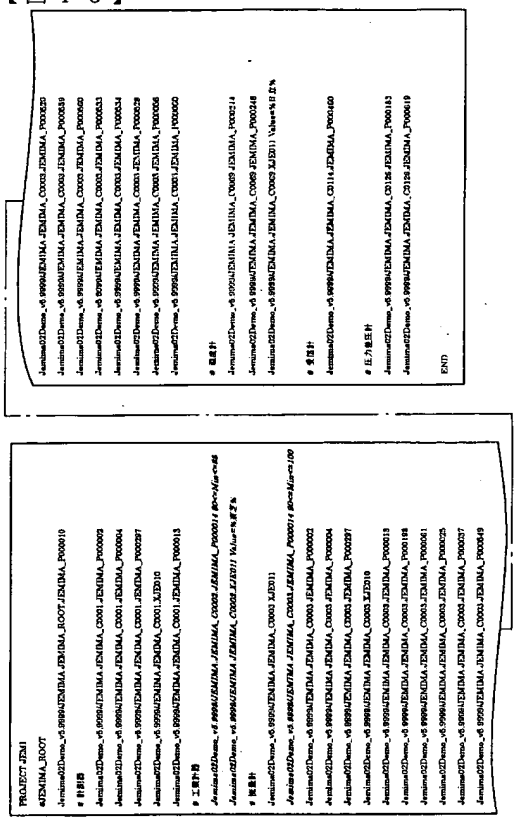


【図１６】



フロントページの続き

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Fターム(参考) 5B075 QT03
5B082 GA08

CLAIMS

[Claim(s)]
[Claim 1]
In a hierarchical database device in which a low-ranking classification has a layered structure which inherits the attribute of a classification of a higher rank,

A means to set at least one attribute which the 1st classification has as a type attribute, and to set attendant information including a search condition over each type attribute as the 1st selectable type attribute set by operation of 1,
A means by which a low-ranking classification inherits said 1st type attribute set rather than said 1st classification,
A means to set up the 2nd type attribute set that a low-ranking classification is made to inherit further to a classification of said low rank using said at least a part of 1st type attribute set
A providing hierarchical database device.
[Claim 2]
The hierarchical database device according to claim 1 providing further a means to set negative succession as either of said type attributes.
[Claim 3]
A means to set up a display order of said type attribute in said 1st classification,

A means by which a classification of said low rank inherits said display order,
The providing hierarchical database device according to claim 1 or 2.
[Claim 4]
The hierarchical database device according to claim 3, wherein said display order which a classification of said low rank inherited is variable.
[Claim 5]
A means to add the 2nd group of a different type attribute from the 1st group of a type attribute inherited from said 1st type attribute set to said 2nd type attribute set is provided,
The hierarchical database device according to any one of claims 1 to 4 inheriting said 2nd type attribute set so that it may become selectable about any 1 of said 1st group and the 2nd groups in a low-ranking classification to a classification of said low rank further.
[Claim 6]
A means to register a user or an user group which accesses a hierarchical database,
The hierarchical database device according to claim 1 providing a means to set up the 3rd type attribute set peculiar to each of said user or an user group, based on said 1st type attribute set.
[Claim 7]
A means which relates e-mail addresses of said user or an user group with said 3rd type attribute set,
A means to detect registration of the new instance which satisfies a search condition included in a subsidiary condition of said 3rd type attribute set,
A means to notify registration detection of said new instance to said user or an user group based on said e-mail address
The providing hierarchical database device according to claim 6.
[Claim 8]
The hierarchical database device according to claim 7 notifying URI of said new

instance further.
[Claim 9]
Claim 7 possessing a means to transmit said new instance to said user or an user group according to a demand based on a notice of registration detection of said new instance, or a hierarchical database device given in either of 8.
[Claim 10]
specifying one concerning said search condition of said users or groups to registration of said new instance -- this -- the hierarchical database device possessing a means to notify an information registrant who registered a new instance according to any one of claims 7 to 9.
[Claim 11]
In a constructing method of a hierarchical database in which a low-ranking classification has a layered structure which inherits the attribute of a classification of a higher rank,
A step which sets at least one attribute which the 1st classification has as a type attribute, and sets attendant information including a search condition over each type attribute as the 1st selectable type attribute set by operation of 1,
A step to which a low-ranking classification inherits said 1st type attribute set rather than said 1st classification,
A constructing method of a hierarchical database possessing a step which sets up the 2nd type attribute set that a low-ranking classification is made to inherit further to a classification of said low rank using said at least a part of 1st type attribute set.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]
This invention relates to what can set up a type attribute in the hierarchical database with which the attribute which a classification (class) has is inherited.
[0002]
[Description of the Prior Art]
In a versatile OS called the operating systems (OS) (trademark) Windows (trademark), UNIX (trademark), and LINUX of Microsoft Corp. (trademark), Tree form directory structure and file structure are visually specified to a user, and the tree view is adopted as a graphic user interface (GUI) for deriving and moving a user to a specific directory and file (navigation).
[0003]
However, in between each node of this tree view, There are no relations between the information, including file etc., included in the node of a higher rank and the information included in a low-ranking node, such as succession relation or inclusion thru/or subset-related, The node on the tree which begins from a root node only means that the receptacle which dedicates information, including a file etc., i.e., a container, is connected to tree form up and down. On these specifications, this kind of structure is called "a hierarchical file structure", and it is distinguished.
[0004]
The database which makes representation the Object Relational Database (ORDB) which appeared as a partial advanced type of an object oriented database (OODB) or a relational database (RDB), It has a layered structure and has a mechanism in which a subdivided classification inherits the attribute of an upper classification in this layered structure. In such a database, there is the feature that an attribute accumulates by low-ranking classification by succession. It is also called "inheritance" that a subdivided classification inherits the attribute of an upper classification, and such art is indicated in much literature (for example, refer to the following nonpatent literature 1.). In an object oriented database (OODB)-related technical field, the classification in a hierarchy is called a "class" in many cases. In this specification, a "classification" and a "class" are used as a term which has the almost same meaning.
[0005]
In an object relational database (ORDB), the table which allowed succession is equivalent to a class. Between the tables in the hierarchical order, an attribute is inherited from the table of a higher rank to a low-ranking table. An attribute here is equivalent to the header information of the column which constitutes a higher rank table in ORDB, and this is inherited to a low order table.
[0006]
In this specification, a "hierarchical database" is called including both an object oriented database (OODB) and an Object Relational Database (ORDB). Data with the same attribute kind belonging to each hierarchy's class is called an "instance", and the set is called "population" of data.
[0007]
Although the mounting method of population is various, for example by ORDB, it is mounted as one or more tables about one classification. The whole population may be

expressed by the set operation and JOIN between tables when mounted as two or more tables.
[0008]
An ISO13584 Parts Library standard (a common name, "PLIB" "Py Liv"), It is an international standard which defines whether the method about the product or component library data which consists of two or more "Part" (it usually translates into a "paper search file") and the semantics of an exchange file format of object-orientation description, what kind of term, the recording mode, and a data type are used. The contents are common in IEC61360-2 (paper search file 2nd) Part42 (paper search file 42nd) of an ISO13584 Parts Library standard. This standard classifies a product in object-orientation, and clarifies the attribute group by which each classification is characterized, and since it is the structure which carries out file exchange of the contents to a classification, of course, the concept of succession of an attribute is included in this. This standard quotes ISO6523 "Structure for Identification of organizations and organization parts", and is made, It is possible to utilize ICD (International Code Designator) which ISO6523 defines especially, and to assign a meaning globally identifier to an attribute.
[0009]
[Nonpatent literature 1]
Object-Oriented Concepts, Databases, and Applications, Edited by Won Kim, 1989, ACM Press
[0010]
[Problem(s) to be Solved by the Invention]
In a database with the layered structure in which the low rank which makes an object oriented database representation inherits the attribute of an upper classification, it has the structure which an attribute accumulates by low-ranking classification according to succession of an attribute. For this reason, the attribute (typical) representing that classification that a common user uses for selection frequently, Distinction of the attribute which is needed only for a ** user group is difficult for the other supplementary attribute or very limited ******, and it is not rare that an attribute number attains to hundreds in the manufacturing specification database of an industrial commodity, either.
[0011]
Therefore, as for a user, when an attribute kind exceeds tens in the case of selection of a product, it is not quite obvious the information about the thing which should just choose an instance paying attention to which attribute, or which attribute is typical information often demanded in the class. For example, when category classifying of the attribute is not carried out, in the case of the manufacturing specification database of an industrial commodity, since there are too many attribute numbers, the feature of each product instance is grasped simply, and it becomes difficult to narrow down an instance with an attribute value and to choose it. For this reason, classifying an attribute kind into a category is often performed.
[0012]
However, setting out of the category is conventionally performed regardless of a classification (class) (for example, in IEC-61360-2 and ISO13584-42). the category classifying of an attribute based on ISO-31 -- describing -- or even when set up for every classification, it was succeeded depending on the succession mechanism which the database itself which has the above-mentioned layered structure simply has, and it was not able to succeed independently and selectively to this succession mechanism.
[0013]
Therefore, the new concept for relating with a classification of a hierarchical database and setting up a type attribute is needed, and further, It plots and the mechanism of showing a user the instance which saves the search condition over the structure and the type attribute of the database which saves a type attribute and which agrees in a search condition further is searched for. However, from the scope of ISO13584 standard, IEC61360 standard, and ISO6523, it has separated from these matters and they are not provided until now.
[0014]
This invention is made in consideration of this situation, and is a thing.
The purpose is to provide the hierarchical database device which can relate with the classification of ** and can set up a type attribute.

[0015]
[Means for Solving the Problem]
A hierarchical database device which this invention requires for this invention is characterized by that a hierarchical database device in which a low-ranking classification has a layered structure which inherits the attribute of a classification of a higher rank comprises:
A means to set at least one attribute which the 1st classification has as a type attribute, and to set attendant information including a search condition over each type attribute as the 1st selectable type attribute set by operation of 1.
A means by which a low-ranking classification inherits said 1st type attribute set rather than said 1st classification.
A means to set up the 2nd type attribute set that a low-ranking classification is made to inherit further to a classification of said low rank using said at least a part of 1st type attribute set.

[0016]
A constructing method of a hierarchical database concerning this invention equips with the following a constructing method of a hierarchical database in which a low-ranking classification has a layered structure which inherits the attribute of a classification of a higher rank.
A step which sets at least one attribute which the 1st classification has as a type attribute, and sets attendant information including a search condition over each type attribute as the 1st selectable type attribute set by operation of 1.
A step to which a low-ranking classification inherits said 1st type attribute set rather than said 1st classification.
A step which sets up the 2nd type attribute set that a low-ranking classification is made to inherit further to a classification of said low rank using said at least a part of 1st type attribute set.

[0017]
[Embodiment of the Invention]
Hereafter, the embodiment of the invention in this application is described with reference to drawings.
[0018]
Drawing 1 is a block diagram showing the outline composition of the system concerning one embodiment of the hierarchical database device concerning this invention. This system is a system of the web (WWW) base through the Internet 6, and can classify a component into the web client 5 and Web server 7 side. The system by the side of Web server 7 is equivalent to this invention. It cannot be overemphasized that this invention is not limited only to the client server system accompanied by such network communication.
[0019]
The web client 5 is provided with the mouse 1, the keyboard 2, the display 3, and GUI4, and is constituted using a general-purpose computer. The web client 5 outputs the data received from the web server 7 to the display 3 via GUI4, and receives data and a command from the pointing device of the keyboard 2 and mouse 1 grade from a user via GUI4, and transmits to Web server 7.
[0020]
Web server 7 can be provided with the mouse 9, the keyboard 10, the display 11, and GUI12 like the web client 5, and can constitute them using a general-purpose computer. Web server 7 is provided with the group 15 of the value of the attribute of the database 16 of the attribute which constitutes the class sorting by which an another name is carried out to a "dictionary", and class sorting, and each class by which an another name is carried out to "contents", i.e., the database of an instance, and the database 17 of the type attribute of class sorting. It has the database management system 8 which manages input and output of the data to these databases 15, 16, and 17, and execution of search.
[0021]
Although it is possible to set up and build the database 17 of a type attribute by the input from the keyboard 10, In order to initialize this simply, the external file 13 or the type attribute setting table 14 for setting out of a type attribute can be used independently [the database 17 of a type attribute].

[0022]
The information about between classes is recorded, and the database 16 of the attribute which constitutes a dictionary, i.e., class sorting, and class sorting understands the upper classification class (superclass) and its subdivided classification class, when one class sorting is chosen. The information about the attribute which belongs to class sorting is recorded on this dictionary data base 16, and when one class sorting is chosen, the information about all the attributes attached to that class is known.
[0023]
The information about the type attribute which belongs to each class is recorded on the database 17 of the type attribute, and when one class sorting is chosen, all the attributes which constitute the group and each group of its of all the type attributes attached to the class are known.
[0024]
This embodiment summarizes an attribute which represents it about a certain classification for 1 set or several sets of type attributes, Succeed (including negative succession), and in the hierarchy of further each, each hierarchy summarizes this group as one sort of classes as a "typical property set" also including the typical search condition value to a type attribute, and inherits it, Per classification class, an addition in this typical property set and deletion are carried out, and change of conditions is enabled. The information and search-values input column about the attribute belonging to one of the typical property sets are displayed, and facilitating of the instance-data selection under classification is aimed at because a user chooses the element on GUI corresponding to this group, for example, a button etc.
[0025]
Supplementary information, including the example of use, an input example, supplementary explanation, etc., other than a search condition shall be included in the typical property set with which the type attribute and search condition of a class are doubled. Among these, only a search condition is called a "query condition set." Unlike the major key (primary key) of the search in a relational database (RDB), or the concept of an index (INDEX), the concept of this typical property set is independent of these. If there is no specification of arrangement and display order between the attributes belonging to the same group, the turn on a specific display or succession will not be given only by belonging to the group of a type attribute. As for each property set, one attribute may appear in two or more typical property sets independently that is,.
[0026]
Drawing 2 shows typically the structure expressing the relation between the class sorting and the attribute in the hierarchical database of this embodiment, a type attribute and the relation of a search condition, i.e., the relation between class sorting, class sorting, the relation of an attribute and class sorting, and a type attribute, and a type attribute and the relation of a search condition. Namely, it is possible to always follow higher rank class sorting in addition to the route class which is the peak of the whole class sorting, Class sorting inherits the search condition corresponding to the group of the attribute which higher rank class sorting has from higher rank class sorting, and a type attribute, i.e., the group of the attribute which consists of one or more of the attribute, and the group of the type attribute. Therefore, it can be considered that the search condition corresponding to the group of a type attribute itself makes one class in this embodiment.
[0027]
<Succession of a search condition>
According to this embodiment, not only succession of an attribute but succession of a search condition is enabled as mentioned above. That is, the paradigm [as opposed to the attribute value about a typical type attribute which is used for search of a certain specific classification] of a search condition or a search condition is also typical, and in a low-ranking classification, the search condition value to the typical attribute group of a classification of a higher rank is inherited, and it is usable in many cases. However, in the conventional hierarchical database, such a search condition did not have the structure which a user should substitute to the last, is not inherited like an attribute, and inherits this to a low rank class as a default search condition.

[0028]
A group's identifier to which the identifier of the group of this typical attribute, the search condition over it, and each user that set it up, or its user furthermore belongs is connected, Save this and again behind a user or which user of the group who belongs, When it was going to search an instance about the classification, there was no thing provided with the mechanism of showing a user the group of the suitable type attribute or type attribute corresponding to the identifier which a user or its group who belongs holds, and a search condition. Succession of this search condition differs from succession of the attribute of the "class" of C++ language which expresses with an object oriented programming language concentration-izing of the variable of the data type of a different kind on the memory provided ordinarily, and encapsulation, or a Java language, and its initialization, It is a concept which is concerned with the search condition as a database and is different.
[0029]
<Negative succession>
This embodiment is aiming at the effect by vanishing this attribute by performing negative succession about the type attribute applied to this subdivided classification, when a new subdivided classification (subclass) is provided.
[0030]
In a database with the layered structure in which the low rank which makes an object oriented database representation inherits the attribute of an upper classification, it has the structure which an attribute accumulates by low-ranking classification according to succession. However, in the classification of a actual product or a living thing, As the origin a certain hierarchy with evolution of a living thing with technical development It or subsequent ones. The feature and character which suited the higher rank in the classification before the hierarchy (higher rank) may disappear, and this was not able to be appropriately expressed with the conventional concept and hierarchical database of the object oriented database.
[0031]
For example, there is a power cable in the conventional household vacuum cleaner, and the power supply and the cleaner were always tied with the power cable. However, these days, the cleaner which changes into power the electrical and electric equipment which a power cable disappears and is supplied from a storage battery for improvement in operativity, and drives a motor exists. Also in an iron for home use, although a power cable is between the electrode holders of a power supply and an iron now, an accumulation type thing without a power cable exists in the main part which actually hits against clothing. Although these are classified as a developed type of a vacuum cleaner, since it seemed in a conventional vacuum cleaner and iron that existence of a power cable is indispensable, usually in a classification of the vacuum cleaner and iron used as an upper classification, an attribute called a power cable arises.
[0032]
what is used for a car as the fuel -- gasoline -- be -- diesel oil -- be -- although an internal combustion engine (combustion engine) of a certain kind is needed, an internal combustion engine does not exist in the latest electromobile that considered environment. If the "internal combustion engine kind" made into an attribute peculiar to a car, for example is removed at this time and it provides as an "engine kind" anew, low-ranking classification, for example, sedan etc., etc., can **** a problem, but. Since instance data will be inputted and accumulated according to the attribute once an attribute peculiar to a classification is defined in many databases regardless of a kind, deleting an attribute from a classification a posteriori causes a big problem on management of a database in many cases.
[0033]
It comprises this embodiment so that the structure of succession of the above-mentioned new attribute, i.e., negative succession, can be incorporated about a type attribute and it can set up. Namely, about the negative attribute which means disappearance of an attribute. That the negative attribute was included in the type attribute in the classification has the peculiarity of not being treated as a thing with an effect in the group of the type attribute to which a low-ranking classification [it] corresponds even if it is not succeeded as an attribute which actually has an effect or exists.
[0034]
Drawing 3 is a figure showing the case where the type attribute group and the search

condition (query condition set) are matched with two or more users' each.
[0035]
According to this embodiment, the group A, B, and C of three type attributes is matched to the user A, B, and C. The group A, B, and C of these type attribute is inherited from the classification class 1 of a higher rank. In drawing 3, what was smeared away by the dot among the ellipses which show an attribute and a search condition is a type attribute inherited from the classification class 1 of a higher rank to the classification class 2, and its search condition. A group's identifier to which a user or a user belongs, and this typical property set are associated, and a user limits the typical property set which can carry out display selection according to a group's identifier to which a user-identification child or a user belongs.
[0036]
<A notice of an E-mail>
In the information which associates the group to whom this typical property set, a user, or a user belongs, When the instance corresponding to the search condition which added the address of an e-mail address or mail, and was indicated during the typical property set is newly registered, All the users belonging to the user or user group registered using the e-mail address are notified by E-mail automatically, or mail can inform them.
[0037]
The instance with which a user agrees on the conditions which a user desires at the time of search of a database is not found, but the instance which fulfills conditions may be registered a posteriori in the classification class which the user considered as search management, or its subdivided classification class (subclass). When an instance is newly registered by registering a search condition for every user in this embodiment, When the existence of what agrees on conditions by applying the existing user's search condition to these instances is investigated and there are some agreeing, this problem is solved by notifying the user who had that registered. Software, such as not only human being's user but other databases and application, may need the instance which fulfills such conditions.
[0038]
By setting a specific e-mail address as a database by making a database or application into a user, When the new instance data which fulfill conditions at any time are registered by the information provider, it enables it to fill up an instance at any time by receiving a notice to that effect by E-mail.
[0039]
The user group [user / A / to the classification class 2 shown in drawing 3 in drawing 4 using a table] "O**, Inc. business", The fictitious user of the trinominal of "William Shakespear", "Thomas Mann", and "Ougai Mori" is related with B, and the "user C" 1 person e-mail address is related with C. Drawing 5 illustrates the e-mail address of drawing 4, and correlation of a type attribute.
[0040]
In the E-mail of which a user is notified when the instance corresponding to the search condition indicated during the typical property set is newly registered, By including URI (Universal Resource Identifiers) of the agreeing instance, the direct lead of the user who received the notice is carried out to the screen where the instance was displayed. In many existing applications, CGI and a servlet are driven via the Internet only by URI clicking the character string from the first, It is possible to call the contents of the file indicated there, and also to drive a script or a program and to display information on a user's web browser.
[0041]
In this embodiment. By that of the database of the others which hit and were previously installed on other Internet addresses notified when the instance corresponding to the search condition indicated during the typical property set is newly registered, and application using directly from a program. or [that it is because an E-mail is sent there including the e-mail address to cut] -- or, When the latter database sends an E-mail to the e-mail address which can access the contents of the E-mail indirectly, Renewal of the instance data which agree in a search condition automatically is notified, and renewal of the automatic data in a latter database and application is realized further.
[0042]
When an information registrant registers a new instance into the database 15, When

the instance corresponding to the search condition indicated during the typical property set exists, . The information registrant who provided the instance was given as one of the attribute values into the instance. Or by notifying by E-mail using the e-mail address (for example, e-mail address indicated in the file which had URI specified by the string value of the attribute in an instance) independently prepared in relation to the instance, Matching of the user and information provider of instance information is performed. The model of matching (collation) of an information registrant and an information user is shown in drawing 6. The attribute in particular itself that describes the e-mail address by the side of an information provider does not need to be contained in the type attribute.
[0043]
In the case of a hierarchical database, since the attribute provided in the higher rank is inherited by the low rank, if the attribute equivalent to an "information provider e-mail address" is provided as a string type as one of the succession attributes by the classification class of the higher rank, a low-ranking classification class will also have this attribute. Therefore, each instance of a low-ranking classification class will have a string value of the e-mail address to this attribute, respectively.
[0044]
As an identifier of the attribute which is especially equivalent to an "information provider e-mail address", In using the method of standard code description called BSU (BasicSemantic Unit) provided in Part42 (the 42nd standard paper search file) of ISO 13584 Parts Library Standard, Since this code has the structure which becomes a meaning via ISO 6523 International CodeDesignator (ICD) in the world, It is one BSU (that is, in this case, it property-BSU(s) and) to an attribute called an information provider e-mail address. Or by assigning a Property_BSU code, making it recognize as what uses that code for e mail transmission to a database system, and exhibiting this dictionary as a standard dictionary, If the hierarchical database of this embodiment is used, the mechanism of matching of the information user by an E-mail and an information provider will become effective equally about the instance data to all the product classification dictionaries in the world which quotes the definition of this dictionary and is created.
[0045]
<List>
According to this embodiment, it is a list which can be referred to from each classification, and one or more possible things of distinguishing the each by an identifier (a name or a code) are prepared. The turn on the identifier of the property attribute which belongs to the typical property set formed in the classification as an element of a list, its display, or arrangement, and the value of the search condition shall be described. This list structure supports drawing 3. As a gestalt of preservation of this list, as shown in drawing 7 instead of a file, it may be a table of a relational database. According to an attribute, a search condition may exist or may not exist. In a search condition, the search condition crowded on both sides of a value can also be described. Drawing 8 summarizes the contents which the table of drawing 7 indicates about the classification class 2.
[0046]
About the turn on a display or arrangement, when a list is used, can use the turn of a statement for a list as display order watch of DIFORUTO, but. As a state of DIFORUTO, during a list, the turn in particular of a statement shall not express the turn on a display or arrangement, may append an integer etc. to an attribute independently, and may specify the turn on a display or arrangement. In order for there to be no specific turn determined a priori in each spacing of the table of the relational database of drawing 7, in the "drawing ranking" column, the turn on a display or arrangement is independently expressed by establishing the sequence of the integer type showing turn, or a string type.
[0047]
As the method of initial setting of the list of this typical property set, What is necessary is to read setting out to each classification and just to determine a typical property set to each classification from the database 14 for type attribute setting which generates by referring to the configuration file 13 shown in drawing 1, or exists on memory at the time of secondary [, such as a hard disk,].
[0048]
under the present circumstances, the contents of the list of typical property sets

about the type attribute which is generated from the configuration file to an upper classification class, and is inherited by the subdivided classification may differ from the contents of the configuration file to the subdivided classification class of the actual condition. In this case, the preliminary decision of the contents of the list of typical property sets is carried out using the contents of the configuration file first inherited from a higher rank, Next, what is necessary is just to overwrite the contents of the corresponding higher rank by the low-ranking contents, when a higher rank and the contents differ from the low-ranking contents in addition to the list of typical property sets which carried out the temporary arrangement of the contents of the list of typical property sets defined into the configuration file of a subdivided classification class. Or what is necessary is to carry out the temporary arrangement of the contents of the list of typical property sets by the contents of the configuration file to a subdivided classification class, and just to lengthen and copy the contents of the list of typical property sets of a higher rank about the attribute which is not described in this configuration file. Under the present circumstances, about the type attribute which shows negative succession, it sets in "positive/negative of succession" column in a table so that it may be beforehand shown in that, for example, drawing 7. Since mark attachment is carried out with "FALSE", it is good if not copied.

[0049]

Overwrite of the contents inherited from the typical property set of the higher rank in the subdivided classification class by this method one by one is attained.

[0050]

Thus, according to each determined typical property set, arrangement and display order of a typical property are determined. About the contents of the list of this typical property set. By indicating and storing in secondary memories, such as a hard disk, or a file eventually, it becomes possible to save the time and effort which determines the contents of the list of typical property sets for the configuration file which a user prepares each time.

[0051]

Drawing 9 is a flow chart which shows the procedure of setting out of a typical property over the class using a configuration file in case the turn of arrangement and a display is an attribute name or the appearance order watch of an identifier. When appearance order watch is specified numerically, it can generally process by reading it and rearranging into an appearance order first. In Step S1, the type attribute about the class concerned, a search condition, and attendant information are first read from a configuration file. The existence of a search condition is judged in Step S2. When there is a search condition, in Step S3, a search condition is written in a type attribute list (list of typical property sets). The existence of negative succession is judged in step S4. When there is negative succession, a mark is given to the attribute which has a negative attribute in Step S5. And in Step S6, setting out about other attributes other than what has negative succession about the classification class of a higher rank is added to the present type attribute list.

[0052]

<Matching>

As mentioned above, when the new instance data which fulfill conditions are registered by the information provider, By recognizing an information registrant's e-mail address indicated considering the notice at any time and to that effect as the attribute not only the registrant of a search condition but in an instance, or its pertinent information, and transmitting the E-mail to the address, Matching (collation) of the user and donor of information is enabled.

[0053]

In the case where this e-mail address is recognized as an attribute, The issuing organization code of 4 figures called ICD which identifies the issue organization of each information code system uniquely based on ISO6523 when the standard code method based on ISO13584 especially about the dictionary of the hierarchical database is used, Since the company and organization code in each information code system are embellished and each classification code within a company and an organization in which this company and organization code are still more effective, and an attribute code are embellished, it is possible to identify the attribute which belongs [in the ISO world] to a meaning at a classification or it.

[0054]

In ISO13584, the attribute which there is structure used into other dictionaries partial or quoting altogether (it is called import below), and imported by the upper classification in a dictionary, the classification system, i.e., the dictionary, which other organizations and a company made, is inherited to a subdivided classification.
[0055]
If the identifier (property BSU) of an attribute used in this embodiment as an e-mail address of the information registrant who set on a certain standard dictionary and the shell is once set up and the system is made to recognize, By importing considerably the attribute the e-mail address of the dictionary of the first is described to be to the second in the classification of a higher rank, also when using the dictionary second which describes another classification system (import), The temporary attribute for which the e-mail address is written using the standard code of a shell without [without it is special and uses the identifying method of the attribute of mounting dependence, and] troubling to the difference of an external attribute name can be specified.
[0056]
Drawing 10 is a flow chart which notifies a user of the information on an instance suitable for conditions, and shows the procedure of matching with an information user and an information provider. In this procedure, a new instance is first registered into a classification class, and a classification class is updated (Step S1). Next, the classification class into which a new instance was registered is detected and specified (Step S2). Next, the existence of the typical property set with which the e-mail address was associated is judged to the registered classification class (Step S3). Since there is no address which notifies the new registration of an instance when this typical property set does not exist, processing is ended. When judged with those with a typical property set with which the e-mail address was related in Step S3, the typical property sets to the classification as which a new instance was detected are collected (step S4). Next, it is judged whether the query condition of the typical property set with which either of the new instances was collected is fulfilled (Step S5). Processing is ended when not fulfilling query condition. When filling, the specification information published by the identifier of an instance or this which fulfills the search condition specified in the query condition set is collected and saved (Step S6). Next, the e-mail addresses relevant to the query condition of the typical property set which fulfills conditions are collected, and the E-mail which makes the contents specification information published by the identifier of an instance or this is created (Step S7). In Step S8, the created E-mail is sent to said collected addressing to an e-mail address (transmission). When notifying an information provider of this (step S9), The E-mail which indicated the inquiry information which contains a customer's (prospective customer) e-mail address in the contact of the information registrant of the specification information of an instance set up a priori as information relevant to it in part at least is transmitted.
[0057]
Drawing 11 is a figure showing the example of GUI of a hierarchical database with 1 set of type attribute. That is, along with the classification, one of the typical property sets is displayed on the screen. By clicking with a mouse the button displayed as "TYPICAL" up in drawing 11, all the type attributes in this classification class can be chosen now at once. Although the attribute to a flow instrument is shown, there is an attribute of a majority of 100 or more pieces in this and it is hard to judge which is a type attribute in a figure, according to the "TYPICAL" button, since a type attribute can be chosen automatically, a user's operation burden is mitigable.
[0058]
The name and selection button of each attribute are displayed under the "TYPICAL" button. About what is set as the type attribute in this classification class, it is preferred to change the foreground color of a square button and to display so that other attributes and distinction are possible.
[0059]
Drawing 12 is a figure showing the example of GUI of a hierarchical database with the group of two or more type attributes. Here, three groups of a type attribute are provided.
[0060]

Drawing 13 is a figure showing the example of description of a type attribute setting file. This corresponds, when it has 1 set of type attribute group. In this type attribute setting file. A classification. And all attributes are ISO13584 (.). And uniqueness is described by the identifier (Supplier_BSU) Class BSU which serves as a meaning in the world over the identifier classification to the donor of information by whom form is specified by ISO6523, and the identifier (Propeerty BSU) to an attribute. In for example, drawing 13
SandS_All3.9999/IECROOT.AAA001.AAE752 300<=Value<=800
SandS_All3.9999/IECROOT.AAA001.JCIE002 Value=%toshiba%
SandS_All3.9999/IECROOT.AAA001.JCIE003 6<=Value
Although described, Among these, SandS_All3.9999/IECROOT is an identifier showing the donor of information, AAA001 is an identifier of a classification class and AAE752, JCIE002, and JCIE003 express the identifier of three different attributes which classification AAA001 has, respectively.
[0061]
"300<=Value<=800" is an example of specification of the search condition which specified the range over numerical value type attribute AAE752. Similarly, "Value=%toshiba%", it is a search condition over attribute JCIE002 of a string type, and the character string which contains "toshiba" as a value is meant. On the other hand, "6<=Value is the example of specification of a search condition that the range of one of the two was specified of the value to numerical value type attribute JCIE003 being [six] equal, or looking for a large thing.
[0062]
Drawing 14 and drawing 15 are examples of GUI from which the example which provided only one group of a type attribute differs. Drawing 14 shows the contents of the property set over an industrial instrument, i.e., a type attribute and a search condition, and drawing 15 shows the contents of the type attribute group (property set) in the flow instrument which is a substatement class [directly under] of an industrial instrument. Drawing 16 shows the example of the configuration file to these two classes.
[0063]
In [as bold letter italics show during the list of drawing 15] an industrial instrument, AC power voltage (the property BSU is JEMIMA_P000014) and a company name (the property BSU is XJE011) were defined as a type attribute, and the MIN value has set up as a search condition what is settled between 80-85 about AC power voltage. About the company name, "Toshiba" is specified by the character string. Description is given only about the type attribute newly provided by this classification class. Therefore, AC power voltage (the JEMIMA_P000014) and a drawing order of the company name (the XJE011) are description which is added to the end of all the type attributes inherited from the measuring instrument which is an upper classification class of an industrial instrument. However, in the flow instrument which is a subdivided classification class of an industrial instrument. Drawing turn is explicitly given to all the attributes inherited from an industrial instrument, and also specification of the search condition of a company name is removed, and a MIN value newly resets up as a search condition what is settled between 90-100 about AC power voltage.
[0064]
If a drawing order (position) of the type attribute currently displayed in drawing 14 and drawing 15 and its search condition are ******(ed) in new [slight], it turns out that the contents of the configuration file are correctly set as a type attribute and a search condition.
[0065]
This invention is not limited to the embodiment mentioned above, but changes variously, and is feasible.
[0066]
[Effect of the Invention]
As explained above, according to this invention, the hierarchical database device which can relate with a classification of a hierarchical database and can set up a type attribute can be provided.
[Brief Description of the Drawings]
[Drawing 1]The block diagram showing the outline composition of the system concerning one embodiment of the hierarchical database device concerning this invention

[Drawing 2]The figure showing the relation between a classification (class), an attribute, a type attribute, and a search condition (query condition set)
[Drawing 3]The figure showing the case where the type attribute group and the search condition (query condition set) are matched with two or more users' each
[Drawing 4]The figure showing the example which associated the type attribute and the e-mail address
[Drawing 5]The figure showing the example which connected the group of the type attribute to the e-mail address
[Drawing 6]The figure showing the model of collation of an information registrant and an information user
[Drawing 7]The figure showing an example of a table which stores a type attribute
[Drawing 8]The figure showing the example of the search condition related with each type attribute group containing the succession attribute to the classification class 2
[Drawing 9]The flow chart which shows the setup steps of the typical property to a class
[Drawing 10]The flow chart which shows the procedure of matching with an information user and an information provider
[Drawing 11]The figure showing the example of GUI of a hierarchical database with 1 set of type attribute
[Drawing 12]The figure showing the example of GUI of a hierarchical database with the group of two or more type attributes
[Drawing 13]The figure showing the example of description of a type attribute setting file
[Drawing 14]The figure showing the example of a screen display of the property set to an upper classification class "industrial instrument"
[Drawing 15]The figure showing the example of a screen display of the property set to a subdivided classification class "flow instrument"
[Drawing 16]Drawing 14, the figure showing the example of the configuration file of a type attribute to 15
[Description of Notations]
1, 9 -- Mouse
2, 10 -- Keyboard
3, 11 -- Display
4, 12 -- GUI (graphical user interface)
5 -- Web client
6 -- Internet
7 -- Web server
8 -- Database management system
13 -- Type attribute setting file
14 -- Type attribute setting table
15 -- Instance database (contents)
16 -- Database of class sorting and a composition attribute (dictionary)
17 -- Database of a class and its composition type attribute

[Translation done.]

MEANS

[Means for Solving the Problem]
A hierarchical database device which this invention requires for this invention is characterized by that a hierarchical database device in which a low-ranking classification has a layered structure which inherits the attribute of a classification of a higher rank comprises:
A means to set at least one attribute which the 1st classification has as a type attribute, and to set attendant information including a search condition over each type attribute as the 1st selectable type attribute set by operation of 1.
A means by which a low-ranking classification inherits said 1st type attribute set rather than said 1st classification.
A means to set up the 2nd type attribute set that a low-ranking classification is made to inherit further to a classification of said low rank using said at least a part of 1st type attribute set.

[0016]
A constructing method of a hierarchical database concerning this invention equips with the following a constructing method of a hierarchical database in which a low-ranking classification has a layered structure which inherits the attribute of a classification of a higher rank.
A step which sets at least one attribute which the 1st classification has as a type attribute, and sets attendant information including a search condition over each type attribute as the 1st selectable type attribute set by operation of 1.
A step to which a low-ranking classification inherits said 1st type attribute set rather than said 1st classification.
A step which sets up the 2nd type attribute set that a low-ranking classification is made to inherit further to a classification of said low rank using said at least a part of 1st type attribute set.

[0017]
[Embodiment of the Invention]
Hereafter, the embodiment of the invention in this application is described with reference to drawings.
[0018]
Drawing 1 is a block diagram showing the outline composition of the system concerning one embodiment of the hierarchical database device concerning this invention. This system is a system of the web (WWW) base through the Internet 6, and can classify a component into the web client 5 and Web server 7 side. The system by the side of Web server 7 is equivalent to this invention. It cannot be overemphasized that this invention is not limited only to the client server system accompanied by such network communication.
[0019]
The web client 5 is provided with the mouse 1, the keyboard 2, the display 3, and GUI4, and is constituted using a general-purpose computer. The web client 5 outputs the data received from the web server 7 to the display 3 via GUI4, and receives data and a command from the pointing device of the keyboard 2 and mouse 1 grade from a user via GUI4, and transmits to Web server 7.
[0020]
Web server 7 can be provided with the mouse 9, the keyboard 10, the display 11, and

GUI12 like the web client 5, and can constitute them using a general-purpose computer. Web server 7 is provided with the group 15 of the value of the attribute of the database 16 of the attribute which constitutes the class sorting by which an another name is carried out to a "dictionary", and class sorting, and each class by which an another name is carried out to "contents", i.e., the database of an instance, and the database 17 of the type attribute of class sorting. It has the database management system 8 which manages input and output of the data to these databases 15, 16, and 17, and execution of search.
[0021]
Although it is possible to set up and build the database 17 of a type attribute by the input from the keyboard 10, In order to initialize this simply, the external file 13 or the type attribute setting table 14 for setting out of a type attribute can be used independently [the database 17 of a type attribute].
[0022]
The information about between classes is recorded, and the database 16 of the attribute which constitutes a dictionary, i.e., class sorting, and class sorting understands the upper classification class (superclass) and its subdivided classification class, when one class sorting is chosen. The information about the attribute which belongs to class sorting is recorded on this dictionary data base 16, and when one class sorting is chosen, the information about all the attributes attached to that class is known.
[0023]
The information about the type attribute which belongs to each class is recorded on the database 17 of the type attribute, and when one class sorting is chosen, all the attributes which constitute the group and each group of its of all the type attributes attached to the class are known.
[0024]
This embodiment summarizes an attribute which represents it about a certain classification for 1 set or several sets of type attributes, Succeed (including negative succession), and in the hierarchy of further each, each hierarchy summarizes this group as one sort of classes as a "typical property set" also including the typical search condition value to a type attribute, and inherits it, Per classification class, an addition in this typical property set and deletion are carried out, and change of conditions is enabled. The information and search-values input column about the attribute belonging to one of the typical property sets are displayed, and facilitating of the instance-data selection under classification is aimed at because a user chooses the element on GUI corresponding to this group, for example, a button etc.
[0025]
Supplementary information, including the example of use, an input example, supplementary explanation, etc., other than a search condition shall be included in the typical property set with which the type attribute and search condition of a class are doubled. Among these, only a search condition is called a "query condition set." Unlike the major key (primary key) of the search in a relational database (RDB), or the concept of an index (INDEX), the concept of this typical property set is independent of these. If there is no specification of arrangement and display order between the attributes belonging to the same group, the turn on a specific display or succession will not be given only by belonging to the group of a type attribute. As for each property set, one attribute may appear in two or more typical property sets independently that is,.
[0026]
Drawing 2 shows typically the structure expressing the relation between the class sorting and the attribute in the hierarchical database of this embodiment, a type attribute and the relation of a search condition, i.e., the relation between class sorting, class sorting, the relation of an attribute and class sorting, and a type attribute, and a type attribute and the relation of a search condition. Namely, it is possible to always follow higher rank class sorting in addition to the route class which is the peak of the whole class sorting, Class sorting inherits the search condition corresponding to the group of the attribute which higher rank class sorting has from higher rank class sorting, and a type attribute, i.e., the group of the attribute which consists of one or more of the attribute, and the group of the type attribute. Therefore, it can be considered that the search condition corresponding to the group of a type attribute itself makes one class in this

embodiment.
[0027]
<Succession of a search condition>
According to this embodiment, not only succession of an attribute but succession of a search condition is enabled as mentioned above. That is, the paradigm [as opposed to the attribute value about a typical type attribute which is used for search of a certain specific classification] of a search condition or a search condition is also typical, and in a low-ranking classification, the search condition value to the typical attribute group of a classification of a higher rank is inherited, and it is usable in many cases. However, in the conventional hierarchical database, such a search condition did not have the structure which a user should substitute to the last, is not inherited like an attribute, and inherits this to a low rank class as a default search condition.
[0028]
A group's identifier to which the identifier of the group of this typical attribute, the search condition over it, and each user that set it up, or its user furthermore belongs is connected, Save this and again behind a user or which user of the group who belongs, When it was going to search an instance about the classification, there was no thing provided with the mechanism of showing a user the group of the suitable type attribute or type attribute corresponding to the identifier which a user or its group who belongs holds, and a search condition. Succession of this search condition differs from succession of the attribute of the "class" of C++ language which expresses with an object oriented programming language concentration-izing of the variable of the data type of a different kind on the memory provided ordinarily, and encapsulation, or a Java language, and its initialization, It is a concept which is concerned with the search condition as a database and is different.
[0029]
<Negative succession>
This embodiment is aiming at the effect by vanishing this attribute by performing negative succession about the type attribute applied to this subdivided classification, when a new subdivided classification (subclass) is provided.
[0030]
In a database with the layered structure in which the low rank which makes an object oriented database representation inherits the attribute of an upper classification, it has the structure which an attribute accumulates by low-ranking classification according to succession. However, in the classification of a actual product or a living thing, As the origin a certain hierarchy with evolution of a living thing with technical development It or subsequent ones. The feature and character which suited the higher rank in the classification before the hierarchy (higher rank) may disappear, and this was not able to be appropriately expressed with the conventional concept and hierarchical database of the object oriented database.
[0031]
For example, there is a power cable in the conventional household vacuum cleaner, and the power supply and the cleaner were always tied with the power cable. However, these days, the cleaner which changes into power the electrical and electric equipment which a power cable disappears and is supplied from a storage battery for improvement in operativity, and drives a motor exists. Also in an iron for home use, although a power cable is between the electrode holders of a power supply and an iron now, an accumulation type thing without a power cable exists in the main part which actually hits against clothing. Although these are classified as a developed type of a vacuum cleaner, since it seemed in a conventional vacuum cleaner and iron that existence of a power cable is indispensable, usually in a classification of the vacuum cleaner and iron used as an upper classification, an attribute called a power cable arises.
[0032]
what is used for a car as the fuel -- gasoline -- be -- diesel oil -- be -- although an internal combustion engine (combustion engine) of a certain kind is needed, an internal combustion engine does not exist in the latest electromobile that considered environment. If the "internal combustion engine kind" made into an attribute peculiar to a car, for example is removed at this time and it provides as an "engine kind" anew, low-ranking classification, for example, sedan etc., etc., can **** a problem, but. Since instance data will be inputted and accumulated according to the attribute once an attribute peculiar to a classification is defined

in many databases regardless of a kind, deleting an attribute from a classification a posteriori causes a big problem on management of a database in many cases.
[0033]
It comprises this embodiment so that the structure of succession of the above-mentioned new attribute, i.e., negative succession, can be incorporated about a type attribute and it can set up. Namely, about the negative attribute which means disappearance of an attribute. That the negative attribute was included in the type attribute in the classification has the peculiarity of not being treated as a thing with an effect in the group of the type attribute to which a low-ranking classification [it] corresponds even if it is not succeeded as an attribute which actually has an effect or exists.
[0034]
Drawing 3 is a figure showing the case where the type attribute group and the search condition (query condition set) are matched with two or more users' each.
[0035]
According to this embodiment, the group A, B, and C of three type attributes is matched to the user A, B, and C. The group A, B, and C of these type attribute is inherited from the classification class 1 of a higher rank. In drawing 3, what was smeared away by the dot among the ellipses which show an attribute and a search condition is a type attribute inherited from the classification class 1 of a higher rank to the classification class 2, and its search condition. A group's identifier to which a user or a user belongs, and this typical property set are associated, and a user limits the typical property set which can carry out display selection according to a group's identifier to which a user-identification child or a user belongs.
[0036]
<A notice of an E-mail>
In the information which associates the group to whom this typical property set, a user, or a user belongs, When the instance corresponding to the search condition which added the address of an e-mail address or mail, and was indicated during the typical property set is newly registered, All the users belonging to the user or user group registered using the e-mail address are notified by E-mail automatically, or mail can inform them.
[0037]
The instance with which a user agrees on the conditions which a user desires at the time of search of a database is not found, but the instance which fulfills conditions may be registered a posteriori in the classification class which the user considered as search management, or its subdivided classification class (subclass). When an instance is newly registered by registering a search condition for every user in this embodiment, When the existence of what agrees on conditions by applying the existing user's search condition to these instances is investigated and there are some agreeing, this problem is solved by notifying the user who had that registered. Software, such as not only human being's user but other databases and application, may need the instance which fulfills such conditions.
[0038]
By setting a specific e-mail address as a database by making a database or application into a user, When the new instance data which fulfill conditions at any time are registered by the information provider, it enables it to fill up an instance at any time by receiving a notice to that effect by E-mail.
[0039]
The user group [user / A / to the classification class 2 shown in drawing 3 in drawing 4 using a table] "O**, Inc. business", The fictitious user of the trinominal of "William Shakespear", "Thomas Mann", and "Ougai Mori" is related with B, and the "user C" 1 person e-mail address is related with C. Drawing 5 illustrates the e-mail address of drawing 4, and correlation of a type attribute.
[0040]
In the E-mail of which a user is notified when the instance corresponding to the search condition indicated during the typical property set is newly registered, By including URI (Universal Resource Identifiers) of the agreeing instance, the direct lead of the user who received the notice is carried out to the screen where the instance was displayed. In many existing applications, CGI and a servlet are driven via the Internet only by URI clicking the character string from the first, It is possible to call the contents of the file indicated there, and also to drive a

script or a program and to display information on a user's web browser.
[0041]
In this embodiment. By that of the database of the others which hit and were previously installed on other Internet addresses notified when the instance corresponding to the search condition indicated during the typical property set is newly registered, and application using directly from a program. or [that it is because an E-mail is sent there including the e-mail address to cut] -- or, When the latter database sends an E-mail to the e-mail address which can access the contents of the E-mail indirectly, Renewal of the instance data which agree in a search condition automatically is notified, and renewal of the automatic data in a latter database and application is realized further.
[0042]
When an information registrant registers a new instance into the database 15, When the instance corresponding to the search condition indicated during the typical property set exists, . The information registrant who provided the instance was given as one of the attribute values into the instance. Or by notifying by E-mail using the e-mail address (for example, e-mail address indicated in the file which had URI specified by the string value of the attribute in an instance) independently prepared in relation to the instance, Matching of the user and information provider of instance information is performed. The model of matching (collation) of an information registrant and an information user is shown in drawing 6. The attribute in particular itself that describes the e-mail address by the side of an information provider does not need to be contained in the type attribute.
[0043]
In the case of a hierarchical database, since the attribute provided in the higher rank is inherited by the low rank, if the attribute equivalent to an "information provider e-mail address" is provided as a string type as one of the succession attributes by the classification class of the higher rank, a low-ranking classification class will also have this attribute. Therefore, each instance of a low-ranking classification class will have a string value of the e-mail address to this attribute, respectively.
[0044]
As an identifier of the attribute which is especially equivalent to an "information provider e-mail address", In using the method of standard code description called BSU (BasicSemantic Unit) provided in Part42 (the 42nd standard paper search file) of ISO 13584 Parts Library Standard, Since this code has the structure which becomes a meaning via ISO 6523 International CodeDesignator (ICD) in the world, It is one BSU (that is, in this case, it property-BSU(s) and) to an attribute called an information provider e-mail address. Or by assigning a Property_BSU code, making it recognize as what uses that code for e mail transmission to a database system, and exhibiting this dictionary as a standard dictionary, If the hierarchical database of this embodiment is used, the mechanism of matching of the information user by an E-mail and an information provider will become effective equally about the instance data to all the product classification dictionaries in the world which quotes the definition of this dictionary and is created.
[0045]
<List>
According to this embodiment, it is a list which can be referred to from each classification, and one or more possible things of distinguishing the each by an identifier (a name or a code) are prepared. The turn on the identifier of the property attribute which belongs to the typical property set formed in the classification as an element of a list, its display, or arrangement, and the value of the search condition shall be described. This list structure supports drawing 3. As a gestalt of preservation of this list, as shown in drawing 7 instead of a file, it may be a table of a relational database. According to an attribute, a search condition may exist or may not exist. In a search condition, the search condition crowded on both sides of a value can also be described. Drawing 8 summarizes the contents which the table of drawing 7 indicates about the classification class 2.
[0046]
About the turn on a display or arrangement, when a list is used, can use the turn of a statement for a list as display order watch of DIFORUTO, but. As a state of DIFORUTO, during a list, the turn in particular of a statement shall not express the turn on a display or arrangement, may append an integer etc. to an attribute

independently, and may specify the turn on a display or arrangement. In order for there to be no specific turn determined a priori in each spacing of the table of the relational database of drawing 7, in the "drawing ranking" column, the turn on a display or arrangement is independently expressed by establishing the sequence of the integer type showing turn, or a string type.
[0047]
As the method of initial setting of the list of this typical property set, What is necessary is to read setting out to each classification and just to determine a typical property set to each classification from the database 14 for type attribute setting which generates by referring to the configuration file 13 shown in drawing 1, or exists on memory at the time of secondary [, such as a hard disk,].
[0048]
under the present circumstances, the contents of the list of typical property sets about the type attribute which is generated from the configuration file to an upper classification class, and is inherited by the subdivided classification may differ from the contents of the configuration file to the subdivided classification class of the actual condition. In this case, the preliminary decision of the contents of the list of typical property sets is carried out using the contents of the configuration file first inherited from a higher rank, Next, what is necessary is just to overwrite the contents of the corresponding higher rank by the low-ranking contents, when a higher rank and the contents differ from the low-ranking contents in addition to the list of typical property sets which carried out the temporary arrangement of the contents of the list of typical property sets defined into the configuration file of a subdivided classification class. Or what is necessary is to carry out the temporary arrangement of the contents of the list of typical property sets by the contents of the configuration file to a subdivided classification class, and just to lengthen and copy the contents of the list of typical property sets of a higher rank about the attribute which is not described in this configuration file. Under the present circumstances, about the type attribute which shows negative succession, it sets in "positive/negative of succession" column in a table so that it may be beforehand shown in that, for example, drawing 7. Since mark attachment is carried out with "FALSE", it is good if not copied.
[0049]
Overwrite of the contents inherited from the typical property set of the higher rank in the subdivided classification class by this method one by one is attained.
[0050]
Thus, according to each determined typical property set, arrangement and display order of a typical property are determined. About the contents of the list of this typical property set. By indicating and storing in secondary memories, such as a hard disk, or a file eventually, it becomes possible to save the time and effort which determines the contents of the list of typical property sets for the configuration file which a user prepares each time.
[0051]
Drawing 9 is a flow chart which shows the procedure of setting out of a typical property over the class using a configuration file in case the turn of arrangement and a display is an attribute name or the appearance order watch of an identifier. When appearance order watch is specified numerically, it can generally process by reading it and rearranging into an appearance order first. In Step S1, the type attribute about the class concerned, a search condition, and attendant information are first read from a configuration file. The existence of a search condition is judged in Step S2. When there is a search condition, in Step S3, a search condition is written in a type attribute list (list of typical property sets). The existence of negative succession is judged in step S4. When there is negative succession, a mark is given to the attribute which has a negative attribute in Step S5. And in Step S6, setting out about other attributes other than what has negative succession about the classification class of a higher rank is added to the present type attribute list.
[0052]
<Matching>
As mentioned above, when the new instance data which fulfill conditions are registered by the information provider, By recognizing an information registrant's e-mail address indicated considering the notice at any time and to that effect as the attribute not only the registrant of a search condition but in an instance, or

its pertinent information, and transmitting the E-mail to the address, Matching (collation) of the user and donor of information is enabled.
[0053]
In the case where this e-mail address is recognized as an attribute, The issuing organization code of 4 figures called ICD which identifies the issue organization of each information code system uniquely based on ISO6523 when the standard code method based on ISO13584 especially about the dictionary of the hierarchical database is used, Since the company and organization code in each information code system are embellished and each classification code within a company and an organization in which this company and organization code are still more effective, and an attribute code are embellished, it is possible to identify the attribute which belongs [in the ISO world] to a meaning at a classification or it.
[0054]
In ISO13584, the attribute which there is structure used into other dictionaries partial or quoting altogether (it is called import below), and imported by the upper classification in a dictionary, the classification system, i.e., the dictionary, which other organizations and a company made, is inherited to a subdivided classification.
[0055]
If the identifier (property BSU) of an attribute used in this embodiment as an e-mail address of the information registrant who set on a certain standard dictionary and the shell is once set up and the system is made to recognize, By importing considerably the attribute the e-mail address of the dictionary of the first is described to be to the second in the classification of a higher rank, also when using the dictionary second which describes another classification system (import), The temporary attribute for which the e-mail address is written using the standard code of a shell without [without it is special and uses the identifying method of the attribute of mounting dependence, and] troubling to the difference of an external attribute name can be specified.
[0056]
Drawing 10 is a flow chart which notifies a user of the information on an instance suitable for conditions, and shows the procedure of matching with an information user and an information provider. In this procedure, a new instance is first registered into a classification class, and a classification class is updated (Step S1). Next, the classification class into which a new instance was registered is detected and specified (Step S2). Next, the existence of the typical property set with which the e-mail address was associated is judged to the registered classification class (Step S3). Since there is no address which notifies the new registration of an instance when this typical property set does not exist, processing is ended. When judged with those with a typical property set with which the e-mail address was related in Step S3, the typical property sets to the classification as which a new instance was detected are collected (step S4). Next, it is judged whether the query condition of the typical property set with which either of the new instances was collected is fulfilled (Step S5). Processing is ended when not fulfilling query condition. When filling, the specification information published by the identifier of an instance or this which fulfills the search condition specified in the query condition set is collected and saved (Step S6). Next, the e-mail addresses relevant to the query condition of the typical property set which fulfills conditions are collected, and the E-mail which makes the contents specification information published by the identifier of an instance or this is created (Step S7). In Step S8, the created E-mail is sent to said collected addressing to an e-mail address (transmission). When notifying an information provider of this (step S9), The E-mail which indicated the inquiry information which contains a customer's (prospective customer) e-mail address in the contact of the information registrant of the specification information of an instance set up a priori as information relevant to it in part at least is transmitted.
[0057]
Drawing 11 is a figure showing the example of GUI of a hierarchical database with 1 set of type attribute. That is, along with the classification, one of the typical property sets is displayed on the screen. By clicking with a mouse the button displayed as "TYPICAL" up in drawing 11, all the type attributes in this classification class can be chosen now at once. Although the attribute to a flow instrument is shown, there is an attribute of a majority of 100 or more pieces in

this and it is hard to judge which is a type attribute in a figure, according to the "TYPICAL" button, since a type attribute can be chosen automatically, a user's operation burden is mitigable.
[0058]
The name and selection button of each attribute are displayed under the "TYPICAL" button. About what is set as the type attribute in this classification class, it is preferred to change the foreground color of a square button and to display so that other attributes and distinction are possible.
[0059]
Drawing 12 is a figure showing the example of GUI of a hierarchical database with the group of two or more type attributes. Here, three groups of a type attribute are provided.
[0060]
Drawing 13 is a figure showing the example of description of a type attribute setting file. This corresponds, when it has 1 set of type attribute group. In this type attribute setting file. A classification. And all attributes are ISO13584 (.). And uniqueness is described by the identifier (Supplier_BSU) Class BSU which serves as a meaning in the world over the identifier classification to the donor of information by whom form is specified by ISO6523, and the identifier (Propeerty BSU) to an attribute. In for example, drawing 13
SandS_All3.9999/IECROOT.AAA001.AAE752 300<=Value<=800
SandS_All3.9999/IECROOT.AAA001.JCIE002 Value=%toshiba%
SandS_All3.9999/IECROOT.AAA001.JCIE003 6<=Value
Although described, Among these, SandS_All3.9999/IECROOT is an identifier showing the donor of information, AAA001 is an identifier of a classification class and AAE752, JCIE002, and JCIE003 express the identifier of three different attributes which classification AAA001 has, respectively.
[0061]
"300<=Value<=800" is an example of specification of the search condition which specified the range over numerical value type attribute AAE752. Similarly, "Value=%toshiba%", it is a search condition over attribute JCIE002 of a string type, and the character string which contains "toshiba" as a value is meant. On the other hand, "6<=Value is the example of specification of a search condition that the range of one of the two was specified of the value to numerical value type attribute JCIE003 being [six] equal, or looking for a large thing.
[0062]
Drawing 14 and drawing 15 are examples of GUI from which the example which provided only one group of a type attribute differs. Drawing 14 shows the contents of the property set over an industrial instrument, i.e., a type attribute and a search condition, and drawing 15 shows the contents of the type attribute group (property set) in the flow instrument which is a substatement class [directly under] of an industrial instrument. Drawing 16 shows the example of the configuration file to these two classes.
[0063]
In [as bold letter italics show during the list of drawing 15] an industrial instrument, AC power voltage (the property BSU is JEMIMA_P000014) and a company name (the property BSU is XJE011) were defined as a type attribute, and the MIN value has set up as a search condition what is settled between 80-85 about AC power voltage. About the company name, "Toshiba" is specified by the character string. Description is given only about the type attribute newly provided by this classification class. Therefore, AC power voltage (the JEMIMA_P000014) and a drawing order of the company name (the XJE011) are description which is added to the end of all the type attributes inherited from the measuring instrument which is an upper classification class of an industrial instrument. However, in the flow instrument which is a subdivided classification class of an industrial instrument. Drawing turn is explicitly given to all the attributes inherited from an industrial instrument, and also specification of the search condition of a company name is removed, and a MIN value newly resets up as a search condition what is settled between 90-100 about AC power voltage.
[0064]
If a drawing order (position) of the type attribute currently displayed in drawing 14 and drawing 15 and its search condition are ******(ed) in new [slight], it turns out that the contents of the configuration file are correctly set as a type

attribute and a search condition.
[0065]
This invention is not limited to the embodiment mentioned above, but changes variously, and is feasible.
[0066]

[Translation done.]

TECHNICAL FIELD

[Field of the Invention]
This invention relates to what can set up a type attribute in the hierarchical database with which the attribute which a classification (class) has is inherited.
[0002]

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]The block diagram showing the outline composition of the system concerning one embodiment of the hierarchical database device concerning this invention
[Drawing 2]The figure showing the relation between a classification (class), an attribute, a type attribute, and a search condition (query condition set)
[Drawing 3]The figure showing the case where the type attribute group and the search condition (query condition set) are matched with two or more users' each
[Drawing 4]The figure showing the example which associated the type attribute and the e-mail address
[Drawing 5]The figure showing the example which connected the group of the type attribute to the e-mail address
[Drawing 6]The figure showing the model of collation of an information registrant and an information user
[Drawing 7]The figure showing an example of a table which stores a type attribute
[Drawing 8]The figure showing the example of the search condition related with each type attribute group containing the succession attribute to the classification class 2
[Drawing 9]The flow chart which shows the setup steps of the typical property to a class
[Drawing 10]The flow chart which shows the procedure of matching with an information user and an information provider
[Drawing 11]The figure showing the example of GUI of a hierarchical database with 1 set of type attribute
[Drawing 12]The figure showing the example of GUI of a hierarchical database with the group of two or more type attributes
[Drawing 13]The figure showing the example of description of a type attribute setting file
[Drawing 14]The figure showing the example of a screen display of the property set to an upper classification class "industrial instrument"
[Drawing 15]The figure showing the example of a screen display of the property set to a subdivided classification class "flow instrument"
[Drawing 16]Drawing 14, the figure showing the example of the configuration file of a type attribute to 15
[Description of Notations]
1, 9 -- Mouse
2, 10 -- Keyboard
3, 11 -- Display
4, 12 -- GUI (graphical user interface)
5 -- Web client
6 -- Internet
7 -- Web server
8 -- Database management system
13 -- Type attribute setting file
14 -- Type attribute setting table
15 -- Instance database (contents)
16 -- Database of class sorting and a composition attribute (dictionary)
17 -- Database of a class and its composition type attribute

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention]
As explained above, according to this invention, the hierarchical database device which can relate with a classification of a hierarchical database and can set up a type attribute can be provided.

[Translation done.]

PRIOR ART

[Description of the Prior Art]
In a versatile OS called the operating systems (OS) (trademark) Windows (trademark), UNIX (trademark), and LINUX of Microsoft Corp. (trademark), Tree form directory structure and file structure are visually specified to a user, and the tree view is adopted as a graphic user interface (GUI) for deriving and moving a user to a specific directory and file (navigation).
[0003]
However, in between each node of this tree view, There are no relations between the information, including file etc., included in the node of a higher rank and the information included in a low-ranking node, such as succession relation or inclusion thru/or subset-related, The node on the tree which begins from a root node only means that the receptacle which dedicates information, including a file etc., i.e., a container, is connected to tree form up and down. On these specifications, this kind of structure is called "a hierarchical file structure", and it is distinguished.
[0004]
The database which makes representation the Object Relational Database (ORDB) which appeared as a partial advanced type of an object oriented database (OODB) or a relational database (RDB), It has a layered structure and has a mechanism in which a subdivided classification inherits the attribute of an upper classification in this layered structure. In such a database, there is the feature that an attribute accumulates by low-ranking classification by succession. It is also called "inheritance" that a subdivided classification inherits the attribute of an upper classification, and such art is indicated in much literature (for example, refer to the following nonpatent literature 1.). In an object oriented database (OODB)-related technical field, the classification in a hierarchy is called a "class" in many cases. In this specification, a "classification" and a "class" are used as a term which has the almost same meaning.
[0005]
In an object relational database (ORDB), the table which allowed succession is equivalent to a class. Between the tables in the hierarchical order, an attribute is inherited from the table of a higher rank to a low-ranking table. An attribute here is equivalent to the header information of the column which constitutes a higher rank table in ORDB, and this is inherited to a low order table.
[0006]
In this specification, a "hierarchical database" is called including both an object oriented database (OODB) and an Object Relational Database (ORDB). Data with the same attribute kind belonging to each hierarchy's class is called an "instance", and the set is called "population" of data.
[0007]
Although the mounting method of population is various, for example by ORDB, it is mounted as one or more tables about one classification. The whole population may be expressed by the set operation and JOIN between tables when mounted as two or more tables.
[0008]
An ISO13584 Parts Library standard (a common name, "PLIB" "Py Liv"), It is an international standard which defines whether the method about the product or component library data which consists of two or more "Part" (it usually translates

into a "paper search file") and the semantics of an exchange file format of object-orientation description, what kind of term, the recording mode, and a data type are used. The contents are common in IEC61360-2 (paper search file 2nd) Part42 (paper search file 42nd) of an ISO13584 Parts Library standard. This standard classifies a product in object-orientation, and clarifies the attribute group by which each classification is characterized, and since it is the structure which carries out file exchange of the contents to a classification, of course, the concept of succession of an attribute is included in this. This standard quotes ISO6523 "Structure for Identification of organizations and organization parts", and is made, It is possible to utilize ICD (International Code Designator) which ISO6523 defines especially, and to assign a meaning globally identifier to an attribute.
[0009]
[Nonpatent literature 1]
Object-Oriented Concepts, Databases, and Applications, Edited by Won Kim, 1989, ACM Press
[0010]

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]
In a database with the layered structure in which the low rank which makes an object oriented database representation inherits the attribute of an upper classification, it has the structure which an attribute accumulates by low-ranking classification according to succession of an attribute. For this reason, the attribute (typical) representing that classification that a common user uses for selection frequently, Distinction of the attribute which is needed only for a ** user group is difficult for the other supplementary attribute or very limited ******, and it is not rare that an attribute number attains to hundreds in the manufacturing specification database of an industrial commodity, either.
[0011]
Therefore, as for a user, when an attribute kind exceeds tens in the case of selection of a product, it is not quite obvious the information about the thing which should just choose an instance paying attention to which attribute, or which attribute is typical information often demanded in the class. For example, when category classifying of the attribute is not carried out, in the case of the manufacturing specification database of an industrial commodity, since there are too many attribute numbers, the feature of each product instance is grasped simply, and it becomes difficult to narrow down an instance with an attribute value and to choose it. For this reason, classifying an attribute kind into a category is often performed.
[0012]
However, setting out of the category is conventionally performed regardless of a classification (class) (for example, in IEC-61360-2 and ISO13584-42). the category classifying of an attribute based on ISO-31 -- describing -- or even when set up for every classification, it was succeeded depending on the succession mechanism which the database itself which has the above-mentioned layered structure simply has, and it was not able to succeed independently and selectively to this succession mechanism.
[0013]
Therefore, the new concept for relating with a classification of a hierarchical database and setting up a type attribute is needed, and further, It plots and the mechanism of showing a user the instance which saves the search condition over the structure and the type attribute of the database which saves a type attribute and which agrees in a search condition further is searched for. However, from the scope of ISO13584 standard, IEC61360 standard, and ISO6523, it has separated from these matters and they are not provided until now.
[0014]
This invention is made in consideration of this situation, and is a thing.
The purpose is to provide the hierarchical database device which can relate with the classification of ** and can set up a type attribute.

[0015]

[Translation done.]